Exploring the Linkages Between Planning and the Barriers to Climate Change Adaptation in Caribbean Small Island Developing States

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

The IPCC Fifth Assessment Report indicates that Small Island Developing States (SIDS) are highly vulnerable to the effects of climate change. Furthermore, there is a considerable adaptation deficit in SIDS which must be addressed to reduce their vulnerability to the effects of climate change, including climate variability. This adaptation deficit can be attributed to the barriers to planned adaptation which exist in SIDS, notably the lack of adequate financial, technical and human resources, institutional and governance deficiencies, and poor leadership among other barriers. Spatial development planning is widely recognized as one of the major avenues which can be used to pursue adaptation. However, research on the barriers to adaptation in SIDS does not sufficiently examine the barriers in relation to the formal planning frameworks which support the development and implementation of adaptation policies. This has constrained our understanding of how the barriers to adaptation are actually manifested in planning practice.

Quantitative and qualitative data were gathered for this research using a three-pronged mixed method approach. This involved a survey with public planners from Caribbean SIDS (n = 51), content analysis of national vision and spatial development plans, as well as national climate change policies (n = 23), and semi-structured interviews with senior national policy makers from Caribbean SIDS (n = 21). The research examines the development of adaptation planning at the regional, national, and local levels in Caribbean SIDS to ascertain the advances that have been made and the aspects of adaptation that are lacking. The research then identifies and assesses the barriers to adaptation in Caribbean SIDS using, in part, Moser & Ekstrom's (2010) diagnostic framework for assessing the barriers to adaptation. The barriers to adaptation are analyzed within the context of the planning frameworks which exist at the regional, national, and local levels in Caribbean SIDS. In addition, the barriers are examined in relation to the stages involved in a

rational oriented adaptation planning process. This facilitated an understanding of how the barriers to adaptation are manifested during the different stages of the adaptation planning process, as undertaken in Caribbean SIDS.

Three clusters of findings emanated from this research. The first relates to the state of adaptation planning in Caribbean SIDS. The second pertains to the barriers to adaptation in Caribbean SIDS. The third focuses on the linkages between the barriers to adaptation and the spatial development planning frameworks and processes through which adaptation policies are mediated.

Regarding the current state of adaptation planning in Caribbean SIDS, the research findings indicate that although adaptation planning is evolving into a policy niche, formal capacity building to support adaptation is mainly taking place at national and regional levels in Caribbean SIDS. The requisite institutional and governance capabilities do not exist at the municipal or community level to allow for substantive adaptation planning to take place. Consequently, local adaptation planning is limited to the ad hoc implementation of donor-funded projects which are not sustainable in the long term. The research findings also revealed that the adaptation planning landscape within Caribbean SIDS is not only characterized by fragmentation with regards to adaptation projects, but also by the simultaneous existence of institutional crowdedness, and institutional voids. For example, in some cases, critical legislation and policies are lacking. In other cases, there are multiple overlapping policies and administrative mandate. In addition, the adaptation planning response in Caribbean SIDS largely addresses the physical dimensions of climate vulnerability, while ignoring the social and economic factors which contribute to vulnerability.

In terms of the barriers to adaptation planning in Caribbean SIDS, the research findings suggest that the barriers to adaptation originate from multiple combined sources, e.g. conflicts and power imbalances among the actors involved in adaptation planning, ineffective institutional and governance arrangements, and the inherent complexity of vulnerable human and natural systems. Likewise, most of the barriers to adaptation are highly interrelated and cannot be understood or addressed in isolation from each other. While identification and ranking of the barriers to adaptation facilitated ease of analysis, qualitatively assessing the causal linkages between the barriers provided better insights into how to address the barriers.

Concerning the linkages between the barriers to adaptation and the planning frameworks in Caribbean SIDS, the key findings point to the inclusion of climate change adaptation on the planning agenda as outlined in high-level national vision plans and policies. However, adaptation is largely ignored in medium term socio-economic policy frameworks which function as the default planning agenda in Caribbean SIDS. Despite the presence of a Regional Framework to guide climate change adaptation and mitigation within CARICOM member states, the national level is where substantive planning agendas are developed and strategic policies formulated. The Regional Framework is not legally binding on CARICOM member states and is to a large extent operationalized through the independent actions of national governments within CARICOM. The research findings also revealed that barriers to adaptation are likely to arise simultaneously rather than in a stepwise linear fashion as normatively depicted in the adaptation planning literature. Likewise, barriers to adaptation are best understood in relation to the entire planning process, rather than the individual stages. Existing barriers to adaptation, even when seemingly dominant within a particular stage of the adaptation planning process, create new barriers which have a domino effect on the entire adaptation planning process. This necessitates treating the adaptation

planning process more like a series of simultaneous interrelated activities, rather than a rigid linear sequence of events.

Theoretical contributions derived from the research findings focus on the application of the rational planning model, incremental planning, and multi-level governance to adaptation planning in Caribbean SIDS. The major takeaway for practice is the need to develop an incremental approach to adaptation planning which facilitates the integration of climate change into short and medium-term planning policies. This is essential to lay the foundation for the long-term transformative change which adaptation requires.

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Dedication

I owe everything to the one behind the scenes – Sheena, my loving wife, without whose unwavering support this dissertation would not be a reality.

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List of Acronyms

APF	Adaptation Policy Framework
BVI	British Virgin Islands
CARICOM	Caribbean Community
CBA	Community Based Adaptation
CCCCC	Caribbean Community Climate Change Centre
CCORAL	Caribbean Climate Online Risk Adaptation Tool
CDEMA	Caribbean Disaster and Emergency Management Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
CMO	Caribbean Meteorological Organization
COP	Conference of the Parties
DRR	Disaster Risk Reduction
EbA	Ecosystem-based Adaptation
ECLAC	Economic Commission for Latin America and the Caribbean
EIA	Environmental Impact Assessment
EU	European Union
GDP	Gross Domestic Product

GOJ	Government of Jamaica
IPCC	Intergovernmental Panel on Climate Change
LDCs	Least Develop Countries
LSPDP	Local Sustainable Development Plans
MDGs	Millennium Development Goals
NAPA	National Adaptation Programmes of Action
NDCs	Nationally Determined Contributions
NEPA	National Environment and Planning Agency
NGO	Non-Governmental Organization
ODPEM	Office of Disaster Preparedness and Emergency Management
REDD+	Reducing Emissions from Deforestation and Forest Degradation plus
RiVAMP	Risk and Vulnerability Assessment Methodology Project
SDGs	Sustainable Developing Goals
SIDS	Small Island Developing States
TCPDO	Town and Country Planning Development Office
UKCIP	United Kingdom Climate Impacts Programme
UNDP	United Nations Development Programme

UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UN-OHRLLS	United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States

Chapter One
Introduction

1.1 Background Statement

The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report and the 2016 United Nations Human Development Report noted that climate change poses an unprecedented threat to human security and development in the 21st century (Adger et al., 2014; UNDP, 2016). Climate change not only creates new development challenges, but it also exacerbates existing challenges and threats such as persistent poverty, loss of livelihoods, and competition over scarce natural resources (Adger et al., 2014; UNDP, 2016). The United Nations 2030 Sustainable Development Goals (SDGs) identify climate change as a priority area for urgent intervention in order to create sustainable human settlements. Increasing scientific evidence suggests that there is a link between anthropogenic induced climate change and the growing frequency of extreme weather events such as droughts, heat waves, floods, and storms (IPCC, 2014a; Vogel et al., 2016). Globally, the risks and challenges associated with climate change are unevenly distributed. Small Island Developing States (SIDS) are the lowest contributors to total global greenhouse gas emissions, but their size, geographic location, ecological fragility, and weak economies render them most vulnerable to the effects of climate change (Bishop & Payne, 2012; UN-ORHLLS, 2011; Voccia, 2012). Poor and disadvantaged communities are likely to suffer the most, both in SIDS and the developed world. The United Nations defines SIDS as "a distinct group of developing countries facing specific social, economic and environmental vulnerabilities" (UN-OHRLLS, 2011, p. 2). SIDS are considered as a special case in terms of their environmental challenges and development needs.

Climate trends suggest that future climate change is likely to be beyond the collective experience and existing capacity of societies (Haasnoot, Kwakkel, Walker, & ter Maat, 2013; Hallegatte, 2009). Limiting global warming to 1.5 ^{0}C above pre-industrial levels is considered as a critical threshold for SIDS, beyond which SIDS are likely to suffer irreversible social displacement, economic, and environmental losses (Mycoo, 2017; Tschakert, 2015). As part of the 2015 Paris Agreement, the global community pledged to take action to limit global warming to 1.5 – 2 ^{0}C above pre-industrial levels. However, the United Nations Human Development Report cautions that the extent to which individual countries are prepared to reduce their greenhouse gas emissions will fall short of achieving the collective goal of keeping global warming to well below 2 ^{0}C (UNDP, 2016). They note that if all countries were to keep their pledges, there is likely to be a 2.4 – 2.7 ^{0}C increase in average global temperature by 2100. Along with increased temperatures, SIDS will also have to contend with further sea level rise and coastal inundation, more frequent and intense storms, drought, flooding, coral bleaching, fresh water decline, and ecosystem destruction, among other climate change impacts (Kelman & West, 2009; Nurse et al., 2014; Voccia, 2012). This makes it imperative that SIDS undertake planned adaptation in response to both present and future climate change impacts. This process involves assessing climate risks and vulnerabilities, establishing adaptation priorities, developing robust and flexible adaptation policies, implementing adaptation measures, and monitoring and evaluating their impacts and outcomes (Nurse et al., 2014).

This dissertation focuses on the response and barriers to planned adaptation in Caribbean SIDS from a spatial development planning perspective. Specifically, this dissertation examines the state of adaptation planning within those Caribbean SIDS which belong to the Caribbean Community (CARICOM) grouping of countries. The examination includes an analysis of the

policy and planning frameworks which are in place to support climate change adaptation at the regional, national, and local levels in Caribbean SIDS. The barriers to adaptation in Caribbean SIDS are examined in relation to the existing planning frameworks through which adaptation policies are mediated. This has enabled an analysis of how the barriers to adaptation are actually manifested within planning practice in Caribbean SIDS, as opposed to merely looking at the barriers in abstraction.

1.2 Conceptual Overview and Definition of Key Terms

Climate change research began with an initial focus on mitigation but has recognized the need for adaptation to cope with present and future climate change impacts (Betsill & Bulkeley, 2007; Dover & Hezri, 2010; Moss et al., 2010). Adaptation is critical to reducing the vulnerability of individuals and communities at risk (IPCC, 2014a; Vogel et al., 2016). Because the impacts of climate change affect virtually all aspects of human security and societal development, adaptation is required at different spatial and societal scales (Adger et al., 2014; Adger, Arnell, & Tompkins, 2005). As a multi-dimensional development challenge, adaptation requires public policy interventions to change the behavior of individuals, households, communities, the private sector, and government – whether by moral suasion, punitive measures, or fiscal incentives (Dovers & Hezri, 2010). Given the broad scope of the adaptation challenge, policy makers are finding it increasingly necessary to integrate climate change into all areas of public policy making (Urwin & Jordan, 2008).

As a product, as well as a driver of public policy, spatial development planning provides an avenue to address climate change adaptation through public policy interventions. Spatial development patterns are widely considered to be one of the main drivers of vulnerability to

climate change (Hamin & Guran, 2009; Pattacini, 2012; Pizarro, Blakely, & Dee, 2006). It is therefore accepted that spatial development planning, which functions as a mechanism for regulating the location, and timing, as well as a form of private and public development, plays an integral role in operationalising climate change adaptation and mitigation (Hurlimann & March, 2012; Matthews, 2013; Pizarro et al., 2006; Wilson & Piper, 2010). Operationalisation refers to defining and implementing adaptation and mitigation measures as a key component of governance and planning practice (Matthews, 2013). Within the context of this dissertation, the focus on adaptation is confined to spatial development planning. This dissertation uses the following definition of spatial development planning, hereafter referred to as planning, as put forward by Wilson & Piper (2010, p. 10).

> the ability to plan in a democratically accountable way, all the activities of economic and service sectors (such as housing, energy, economic development, transport, water, waste management, social welfare, health, etc.) that have spatial or land use consequence in their wider social and environmental context.

This definition was chosen because it reflects the on-going evolution of planning beyond the traditional confines of land use to embrace a broader perspective, encompassing the social and economic dimensions of development and their spatial implications.

While essential to enabling climate change adaptation, planning alone is not sufficient in ensuring that public policy addresses the scale, complexity, and range of issues associated with climate change (Bulkeley, 2013; Campbell, 2006; Wilson & Piper, 2010). This admission inevitably leads to recognising the role of governance, specifically climate governance in shaping adaptation and mitigation policies. The governance architecture for climate change

includes all the decision-making procedures, norms, principles and institutions, which determine climate policy among stakeholders across all scales (Biermann, van Asselt, & Zelli, 2009; Dovers & Hezri, 2010). Unlike conventional planning which is state driven with pre-defined mandates and hierarchical power arrangements, governance is not confined to administrative boundaries and includes on-going fluid interactions among multiple stakeholders across scales via self-organizing networks (Bulkeley, 2013; Saito-Jensen, 2015; Ostrom, 2010; Pahl-Wostl, 2009). In other words, governance is concerned with all aspects of decision making within society, while planning is limited to geographically-defined administrative areas and bounded by set frameworks. Planning and its role in climate change adaptation and mitigation should, therefore, be regarded as a sub-component of the broader governance of climate change.

Public policy operates within the existing parameters of law, politics, and governance (Dovers & Hezri, 2010). Because planning frameworks are underpinned by legislation which defines the mandate of planning agencies and gives legal status and clarity to the planning process, there is legitimacy in using planning to advance adaptation and mitigation. Having established policy and planning frameworks are essential to the creation and implementation of adaptation and mitigation policies within society. Within this dissertation, policy framework refers to a high-level strategic roadmap which articulates the position or avowed intent of government with regards to climate change adaptation and mitigation (Dovers & Hezri, 2010, Urwin & Jordan, 2008). While high-level policy frameworks are useful in outlining strategic intent, planning frameworks allow for the creation of plans detailing specified policy interventions and actions. Use of the term planning framework within this dissertation is understood as the legal and institutional mechanisms which enable concrete adaptation decision-making and implementation, usually by means of public policy (Dovers & Hezri, 2010;

Lawrence et al., 2015; Matthews, 2013). In essence, policy frameworks function as strategic enablers of adaptation and mitigation, while planning frameworks are the medium through which adaptation and mitigation are operationalized.

The concept of adaptation planning can be viewed from two complementary perspectives. The first involves a process of developing a comprehensive adaptation plan through a series of iterative steps with feedback loops comprising problem identification, agenda setting, policy development, policy appraisal, implementation, and monitoring and evaluation (see Clar, Prutsch, & Steurer, 2013; Moser & Ekstrom, 2010; Willows & Connell, 2003). This approach treats adaptation as a full-fledged policy domain, rather than solely relying on sectoral provisions to advance adaptation (Uittenbroek et al., 2014). The second and more traditional approach is integrating adaptation and mitigation measures into sectoral plans and policies, without necessarily going through a full planning cycle – a process commonly referred to as mainstreaming (Klein et al., 2007; Uittenbroek et al., 2014). Although the adaptation literature attempts to make a distinction between the two operational approaches to adaptation planning outlined above, they are not clearly distinguishable in practice. Hence this dissertation takes a unified perspective of adaptation planning blending together the conventional mainstreaming approach with the emerging dedicated approach which treats climate change adaptation as a distinct policy domain. Therefore, adaptation planning as used in this dissertation jointly refers to the process involved in developing comprehensive adaptation plans and mainstreaming.

The effectiveness of adaptation planning in reducing vulnerability and building resilience to climate change is impacted by constraining and enabling factors. Commonly identified barriers that constrain adaptation include: institutional deficiencies, poor communication between climate scientists and policy makers, lack of technical and financial resources,

difficulties in downscaling climate change scenarios to the local level, weak leadership and governance, inability to reconcile short-term planning with long-term adaptation, and challenges in developing suitable indicators to monitor progress towards adaptation (Betzold, 2015; Bhave, Conway, Dessai, & Stainforth, 2016; Eisenack et al., 2014; Hamin, Gurran, & Emlinger, 2014; Kuruppu & Willie, 2015; Spires, Shackleton, & Cundill, 2014; Ekstrom & Moser, 2014). The barriers to adaptation cannot be fully understood in isolation, as some barriers influence or create other barriers (Eisenack et al., 2014). Furthermore, some barriers are also generic barriers, which are not exclusively confined to adaptation planning but have long existed in diverse policy arenas (Biesbroek, Klostermann, Termeer, & Kabat, 2013). These include environmental policy, social policy, and development policy.

Conversely, there are opportunities or enabling factors which facilitate adaptation planning. Both barriers to and opportunities for adaptation planning co-exist within the same policy context or policy space and are fundamentally tied to issues such as institutional capacity, resource availability, leadership, and collaboration (Burch, 2010; Eisenack, et al., 2014). Thus, both barriers to and opportunities for adaptation planning can be regarded as opposite sides of the same coin. While opportunities for adaptation planning may spontaneously arise, often these opportunities must be deliberately created by breaking down or transforming existing barriers into concrete actions to support adaptation (Burch, 2010; Ekstrom & Moser, 2014). This underscores the synergistic relationship that exists between the barriers to and opportunities for adaptation.

1.3 Research Focus

1.3.1 Statement of the Problem

The response to climate change in SIDS is not commensurate to the current and future climate risks which SIDS face. Simply put, there is a huge adaptation deficit in SIDS. Though SIDS are among the most vulnerable to the impacts of climate change, they lack the requisite capacity needed to adapt (Nurse et al., 2014). Strengthening the adaptive capacity of SIDS to address climate change is necessary for their sustainable development. The failure of SIDS to design and implement more effective adaptation policies has been attributed to the existence of several barriers, notably institutional deficiencies, and the lack of adequate financial and technical resources (Betzold, 2015; Butcher-Gollach, 2015; Lata & Nunn, 2012; Robinson & Doran, 2017; Spires et al., 2014). In addition, compared to developed countries, there is a dearth of research on the barriers to climate change adaptation in SIDS – creating an empirical vacuum which must be filled, if the scientific community is to more meaningfully contribute to overcoming the barriers to adaptation in SIDS.

Existing research on the barriers to adaptation in SIDS does not sufficiently consider the barriers in relation to the actual planning contexts which exist in SIDS. Though planning continues to be a primary vehicle for enacting public policy to address climate change adaptation and mitigation (Davoudi, Crawford, & Mehmood, 2009; Hurlimann & March, 2012; Matthews, 2013; Pizarro et al., 2006; Wilson & Piper, 2010), planning processes are partially overlooked in the limited discourse on the barriers to adaptation in SIDS. Robinson (2017) in a study examining national level adaptation trends in sixteen SIDS from across the globe based on their National Communications to the UNFCCC, found that while attention is given to planning, it is

not a major focus of adaptation. The failure of the adaptation planning literature to link the barriers to adaptation in SIDS with the planning frameworks through which adaptation policies are developed and implemented has resulted in an insufficient understanding of the barriers in terms of how they are manifested in planning practice.

A deeper understanding of the connection between the barriers to adaptation and the planning frameworks in SIDS is an important step in building much needed adaptive capacity and making real-world progress in adaptation in SIDS. To achieve this, the following knowledge gaps must be addressed and provide the impetus for this research.

Gap # 1: The paucity of scholarly research on the barriers to climate change adaptation in SIDS, the consequence of which is that limited empirical work is available to guide practitioners in designing and implementing more effective adaptation policies.

Gap # 2: The failure of the adaptation planning literature to sufficiently connect the barriers to adaptation in SIDS with the planning frameworks through which actual adaptation policies are created and implemented in SIDS. Essentially, the barriers to adaptation are not sufficiently examined in relation to actual planning practice. This makes the literature less useful to practitioners and researchers who are seeking ways to address the barriers to adaptation.

1.3.2 Research Objectives

In addressing the research problem outlined above, this research seeks to accomplish the following objectives:

I. Evaluate the current state of adaptation planning in Caribbean SIDS.

II. Identify and assess the barriers to adaptation planning in Caribbean SIDS.

III. Explore the linkages between the barriers to adaptation and the policy and planning frameworks which are used to advance adaptation in Caribbean SIDS.

1.4 Theoretical and Analytical Lens for Examining the Research Objectives

As a multi-dimensional issue, climate change adaptation invariably lends itself to a wide range of theoretical and analytical assessments. As previously mentioned, the focus on adaptation within this dissertation is from a planning perspective. Consequently, this dissertation draws on theoretical and analytical frameworks rooted in the discipline of planning to explore the research objectives.

Objective 1: Evaluate the current state of adaptation planning in Caribbean SIDS.

This objective was undertaken by examining the practical and, to a lesser extent, conceptual effectiveness of the various policy and planning frameworks which are in place to support adaptation at the regional, national, and local levels in Caribbean SIDS. This is extensively addressed in chapters three and five, and to a lesser extent in other segments of this dissertation. As a starting point, the rational planning model was used to conceptually represent the adaptation planning process. The rational planning model was chosen because the steps involved in policy making are most clearly enunciated by this model. The core tenets of the rational planning model, i.e. problem identification, agenda setting, policy formulation and appraisal, implementation, and monitoring and evaluation constitute the basic organization of the planning process (Huxley & Yiftachel, 2000; Potts, Vella, Dale, & Sipe, 2014; Taylor, 1998). The use of the rational planning model allowed for this research to gauge the actual progress being made by Caribbean SIDS towards full implementation of planned adaptation. It also allowed for the identification of those aspects of the adaptation planning process that are lagging behind and are in need of urgent attention.

Within this dissertation, reference is made to rational planning as a procedural planning theory which can be used to describe the basic components of the planning process. As Potts et al (2014, p. 13) explain: "The rational policy analysis model can be relevant and useful as a practical approach for discussing and analysing the planning process, provided that underlying complexities, uncertainties, and non-linear nature of planning are recognised." While the discourse on the current state of adaptation planning in Caribbean SIDS starts out by using rational planning as a conceptual frame of reference, the research findings indicate that other planning perspectives, for example, incremental planning, and multi-level planning are also relevant to illuminating various aspects of the adaptation planning process in Caribbean SIDS. This is discussed in section 8.3 which looks at the contribution of this research to theory and practice.

Objective 2: Identify and assess the barriers to mainstreaming climate change adaptation in Caribbean SIDS**.**

Chapter six is largely dedicated to addressing this objective. This objective was addressed using a four-pronged approach. The first aspect involved the use of dominant analytical frameworks present in the literature to assess the sources of the barriers to adaptation in Caribbean SIDS. The second involved creating a classification of the barriers to adaptation in Caribbean SIDS based on a review of the SIDS literature and the survey findings of this research. The third aspect involved a qualitative assessment of the interrelationships among the identifiable barriers to adaptation in Caribbean SIDS, based on the survey and interview results for this research. The fourth aspect involved applying Moser and Ekstrom's (2010) diagnostic framework for addressing the barriers to adaptation to the Caribbean SIDS context.

The sources of the barriers to adaptation in Caribbean SIDS were assessed using the process-oriented framework (Moser & Ekstrom, 2010) and the actor-oriented framework (Biesbroek et al., 2013; Eisenack et al., 2014). The process-oriented framework emphasises that barriers to adaptation do not arise directly from climate change per se, but stem largely from the mechanisms through which adaptation policies are developed and implemented. Conversely, the actor-oriented framework focuses on the dynamics of the relationship among the various actors and how this affects policy making and implementation. The two frameworks, though different, are in fact complementary. While adaptation planning is reliant on various institutional and governance mechanisms for policy development and implementation, it also involves several actors with competing interests operating in an environment characterized by uneven access to information and unequal power arrangements.

Based on their similarities, individual barriers to adaptation identified from the literature and the research findings were grouped into categories for ease of analysis. The categories of barriers are physical barriers, resource constraints, institutional and governance constraints, conflicting scales, leadership, communication and collaboration, and perception and awareness. The interrelationships and causal linkages among the individual barriers were examined to better understand how barriers to adaptation influence each other.

Moser and Ekstrom (2010) developed a matrix for diagnosing the barriers to adaptation in order to help locate points of intervention to overcome a given barrier. Barriers to adaptation are diagnosed as a combination of legacy barriers, contemporary barriers, proximate barriers, or remote barriers based on their source of origin and the influence or control which policy makers have over them. Based on the diagnosis, recommendations are drawn about how policy makers could go about addressing such barriers.

Objective 3: Explore the linkages between the barriers to adaptation and the policy and planning frameworks which are used to advance adaptation in Caribbean SIDS.

This objective is addressed in chapters six and seven. Inspired by Moser and Ekstrom (2010) and Clar, et al (2013), specific barriers to adaptation in Caribbean SIDS are mapped to the different stages of the adaptation planning process as depicted in the rational planning model. Cross-cutting barriers which affect all the stages of adaptation planning are also identified and discussed. The underlying assumption is that to strengthen the adaptation planning process requires identification of those barriers which are unique to the different stages of adaptation, as well as the cross-cutting barriers. In addition, the barriers to adaptation identified from this research are discussed in relation to the specific policy and planning frameworks which support adaptation at the regional, national, and local levels in Caribbean SIDS. Guiding principles for addressing the barriers to adaptation in Caribbean SIDS are also explored and buttressed with the research findings, as well as examples of best practice drawn from the adaptation planning literature.

1.5 Approach to the Research

Research can be viewed as a systematic process of investigating an observed phenomenon, for the presumed purpose of better understanding and improving our world (Palys & Atchinson, 2014). Traditional approaches to research involve the use of either quantitative or qualitative methods. Quantitative data is derived from numeric assessments using statistical procedures and is useful in providing a big picture analysis of patterns, trends, and relationships within a given population (Creswell, 2014; Vogt, Gardner, & Haeffele, 2012). Qualitative analysis relies on the use of textual, oral, and graphic data and is particularly helpful in

constructing detail narratives which explore specific themes and issues within a given context (Creswell, 2014; Palys & Atchinson, 2014; Vogt et al., 2012). A third paradigm includes mixed-methods research which blends qualitative and quantitative approaches to shed a composite light on the phenomenon being investigated (Creswell, 2014; Palys & Atchinson, 2014). A review of the literature suggests that primarily qualitative, as well as mixed-methods techniques are widely used in adaptation planning and barriers research (see Biesbroek, Klostermann, Termeer, & Kabat, 2011; Burch, 2010; Ekstrom & Moser, 2014; Jones & Boyd, 2011; Lata & Nunn, 2012; Measham et al., 2011; Nordgren, Stults, & Meerow, 2016; Picketts, Dery, & Curry, 2014; Robinson, 2017; Tompkins et al., 2010; Urwin & Jordan, 2008; Wheeler, 2008). Much of this research takes the form of case studies which provide a rich body of information on local adaptation planning and the barriers to adaptation.

Collecting both quantitative and qualitative data provides a more complete understanding of the research problem than relying on one type of data alone. In addition, a mixed-method approach capitalizes on the strengths of both quantitative and qualitative data and in so doing may neutralize their respective weaknesses (Creswell, 2014; Tight, 2017). The objectives of this research interrogate several aspects of adaptation planning in Caribbean SIDS which require different types of data, and in so doing support the use of a mixed-method approach. The first objective seeks to evaluate the current state of adaptation planning in Caribbean SIDS. It relies on the use of a survey to create a general overview of adaptation planning across Caribbean SIDS, along with interviews and content analysis which are used to probe key themes and develop a detailed narrative. The second objective focuses on identifying and assessing the barriers to adaptation in Caribbean SIDS. A survey is used to enumerate and classify the barriers to adaptation, while interviews are used to probe causal relationships and the underlying reasons

for the occurrence of the barriers. The third objective explores the linkages between the barriers to adaptation and the policy and planning frameworks which are used to advance adaptation in Caribbean SIDS. It draws on the triangulated results of the survey, interviews, and content analysis to accomplish this. A fulsome description of the relationship between the research objectives and the data collection and analysis process is provided in sections 4.5, 4.6 and 4.7.

The specific type of mixed-methods approach used in this research is an explanatory sequential mixed-methods case study design (see section 4.4). In this approach, the analysis of quantitative data is used to inform the subsequent collection of qualitative data. The qualitative data builds on the results of quantitative data which are explained in greater detail (Creswell, 2014). With the use of this approach, rather than directly comparing the quantitative and qualitative results, the discussion of the findings focuses on the complementary use of both quantitative and qualitative data to provide depth of analysis.

1.6 Organization of Dissertation

This dissertation is organized into eight chapters, including this introductory chapter. This chapter establishes the background to the research. It highlights the threat of climate change and the need for planned adaptation in SIDS. A comprehensive conceptualization of adaptation planning is presented which involves both mainstreaming and undertaking a comprehensive adaptation planning process. A succinct overview of the barriers to adaptation planning is outlined. The research problem emphasizes a major disconnect which exists in the SIDS literature, whereby the barriers to adaptation are examined in isolation of the planning and policy frameworks which exist in SIDS. Addressing this disconnect is the primary purpose of this research which seeks to improve the planning response to the barriers associated with climate

change adaptation in Caribbean SIDS. Three principal objectives are used to guide the investigation into the research problem. These objectives employ the use of various theoretical and analytical perspectives to help frame the data analysis, discussion, and conclusions which are presented in chapters five, six, seven, and eight of this dissertation.

Chapter two establishes the empirical foundation for this research by reviewing the relevant academic literature on adaptation planning and the barriers to adaptation, with special reference to SIDS. Key concepts which underpin adaptation are examined, namely: vulnerability, adaptive capacity, and resilience. A generic description of a rational-oriented adaptation planning process is provided. The scalar dimensions of adaptation planning are examined, as well the planning tools which support mainstreaming. To further strengthen the empirical foundations of this research, the literature then hones in on adaptation planning as conceptualized and practiced in SIDS. This is followed by an examination of the barriers to adaptation planning as manifested within the context of SIDS, and the wider developing world. Analytical frameworks for addressing the barriers to adaptation are briefly examined. Critical research gaps in adaptation planning and the barriers to adaptation in SIDS are highlighted. The chapter then outlines how these gaps will be addressed by this research, followed by a brief conclusion.

Chapter three outlines the context of the case study on which this research is based – Caribbean Small Island Developing States (SIDS). The chapter identifies and introduces Caribbean SIDS as those countries that are members of the Caribbean Community (CARICOM). As a regional integration body, CARICOM has one of the largest groupings of SIDS in the world. The chapter then outlines the vulnerability of Caribbean SIDS to climate change and the threat of climate change to their sustainable development. An overview of the governance architecture for addressing climate change in Caribbean SIDS is also presented in this chapter.

The description of the study area provided in this chapter lays the foundation for contextualizing the discussion of the research findings in chapter seven.

Chapter four outlines the methodological framework for this research. It includes the philosophical paradigm underpinning this research, the research design, and the methods used to collect the data. The chapter details the process by which a mixed method approach was developed and applied across twenty Caribbean SIDS to ascertain data on the state of adaptation planning and the barriers to adaptation. The chapter finishes by looking at the limitations of the research design and how they were addressed.

Chapters five and six present the findings which emanated from this research. The findings are divided into two groupings. The first group of findings speaks to current state of adaptation in Caribbean SIDS. This is presented in chapter five. The second group of findings are related to the identifiable barriers to adaptation within Caribbean SIDS and are presented in chapter six.

Chapter seven integrates and discusses the findings outlined in both chapters five and six. In so doing, chapter seven connects the barriers to adaptation with the planning and policy frameworks for climate change adaptation in Caribbean SIDS. This chapter also explores how the barriers to adaptation in Caribbean SIDS can be possibly addressed. It put forward a set of guiding principles for addressing the barriers to adaptation, as well as discusses opportunities and entry points for mainstreaming adaptation into planning within Caribbean SIDS.

The final chapter presents the conclusions of this research. It outlines the extent to which the research objectives stated in chapter one are addressed. The contribution of this research to the theory and practice of addressing the barriers to adaptation in SIDS is highlighted. In keeping

with the overall findings of this research, areas for possible future research are recommended – the emphasis being on the need to move the adaptation process forward to the latter stages of the planning cycle.

Chapter Two – Literature Review

Adaptation Planning: Concepts, Approaches, and Barriers

2.1 Introduction

This chapter provides a summary of the discourse on adaptation planning and the barriers to adaptation, particularly within the context of SIDS. Key foundational concepts related to adaptation planning are discussed. A generic overview of the adaptation planning process is presented, including the influence of the rational model on adaptation planning. The dominant conceptual and operational approaches to adaptation planning in SIDS are examined, including best practices and emerging trends. A synthesis of the barriers to adaptation encountered in SIDS and the wider developing world is presented. This segues into a brief exploration of analytical frameworks for addressing the barriers to adaptation and building adaptive capacity within SIDS. The literature review then shifts focus and turns its attention to the research gaps which exist within the scholarship on adaptation planning and the barriers to adaptation in SIDS. An outline is then provided as to how this research will help to address those gaps. The chapter ends with a brief concluding paragraph which highlights the importance of SIDS paying greater attention to formal planning in addressing the barriers to adaptation moving forward.

2.2 Conceptual Foundations of Adaptation Planning

2.2.1 Vulnerability

Vulnerability is a key concept in climate change research and adaptation planning. It is the catalyst for adaptation planning in that it helps us to understand why human and natural systems are adversely affected by climate change impacts such as sea level rise, storms, drought, extreme weather events, and the measures that need to be taken to minimize these impacts (Costa

& Kropp, 2013; Fussel & Klein, 2006; Joakim, Mortsch, & Oulahen, 2015; Ribot, 2011; Soares, Gagnon, & Doherty, 2012). The concept of vulnerability essentially connotes susceptibility to harm. The IPCC (2007, p. 883) defines vulnerability as "the degree to which a system is susceptible to and is unable to cope with the adverse effects of climate change, including climate variability and extremes". Vulnerability arises when sensitive human and natural systems are exposed to climatic hazards and lack the capacity to cope and adapt (Adger, 2006; Costa & Kropp, 2013). Vulnerability is, therefore, a function of exposure, sensitivity, and the lack of adaptive capacity. Sensitivity is the degree to which a system or species is affected, either adversely or beneficially, by climate variability or change (IPCC, 2014c).

Although the IPCC definition of vulnerability is widely accepted, there are different interpretations of vulnerability. Three main conceptual models of vulnerability can be identified within the climate change literature. These are the risk-hazard framework, the social constructivist framework, and the integrated framework (Adger, 2006; Cutter, 1996; Eakin & Luers, 2006; Fussel & Klein, 2006; Patt, Schroter, Vega-Leinert, & Klein, 2009).

The risk-hazard framework is primarily used in disaster risk reduction and disaster risk management research. Within this framework, vulnerability occurs whenever a system is threatened or exposed to external climatic hazards or stressors such as sea level rise, storm surge, drought, increased temperatures, etc. The focus is on the physical attributes of specific hazards: their geographic distribution, the threats which the hazards pose, and the damage they create, for example, the number of people who are likely to be affected, infrastructure, and property damage (Cutter, 1996; Eakin & Walser, 2008). Consequently, limiting the exposure of individuals and systems to climatic hazards is the main method of addressing vulnerability within the risk-hazard framework. Viewed through the lens of the risk-hazard framework, vulnerability is considered as

an end result or outcome of the adverse effects generated by climatic hazards (Fussel & Klein 2006, O'Brien, Eriksen, Nygaard, & Schjolden, 2007). This analytical framing primarily depicts vulnerability as a static condition which occurs at a given point in time, in that it does not consider the factors which contribute to on-going changes in vulnerability among individuals, households, and communities.

The social constructivist approach to vulnerability emerged in response to the shortcomings of the risk-hazard framework, which is criticized for failing to take the social and economic drivers of vulnerability into account (Adger & Kelly, 1999; Cutter, 1996; Smit & Wandel, 2006). As noted by Cutter (1996, p. 533), the social constructivist approach to vulnerability "highlights the social construction of vulnerability, a condition rooted in historical, cultural, social and economic processes that impinge on individual's or society's ability to cope with disasters and adequately respond to them". This approach focuses on the social determinants of exposure and sensitivity that causes individuals, households, and communities to be vulnerable, for example, poverty, livelihood practices, land use, weak governance arrangements and institutional capacity (Adger & Kelly, 1999; Bennett, Blythe, & Ban, 2016; O'Brien et al., 2007; Pelling, 2011a; Smit & Wandel, 2006). These factors are highly context-specific, which makes the social constructivist approach a useful lens for examining vulnerability at local scales (O'Brien et al., 2007; Smit & Wandel, 2006). Because the social determinants of vulnerability are inherently dynamic, the social constructivist approach depicts vulnerability as a dynamic state, as opposed to a static condition at a given point in time.

The integrated approach to vulnerability was developed to portray vulnerability research in a more holistic manner by jointly considering the physical and social factors which make people vulnerable to climate change (Fussel, 2007; Hameed, Holzer, Doerr, Baty, & Schwartz,

2013; Kelly & Adger, 2000; Nicholls, Wong, Burkett, Woodroffe, & Hay, 2008). It is context-specific and considers vulnerability both as a biophysical risk posed by climate hazards, and a social response to the risks faced. Vulnerability is examined by looking at how social, economic, institutional, and environmental factors interact to strengthen or weaken human and natural systems to withstand the impacts of climate change (Fussel, 2007). This approach looks at the multiple causes and effects of vulnerability, both from a present and future perspective. However, the integrated approach has been criticized by O'Brien et al., (2007) for trying to reconcile two distinctly opposite conceptual approaches to vulnerability: the outcome and contextual views of vulnerability.

2.2.2 Defining Adaptation

It is widely acknowledged that adaptation to climate change is critical to reducing the vulnerability of individuals, households, and communities at risk (Fussel, 2007; IPCC, 2014b; Pelling, 2011a; Smit & Wandel, 2006; Vogel, Moser, Kasperson, & Dabelko, 2007). The concept of adaptation has its genesis in the biological sciences but has been transposed into the planning discourse to help develop a conceptual understanding of the human dimensions of climate change (Folke et al., 2010; Smit & Wandel, 2006; Tyler & Moench, 2012). The IPCC (2014c, p. 1758) defines climate change adaptation as "The process of adjustment to actual or expected climate and its effects to moderate or avoid harm or exploit beneficial opportunities". This definition presupposes that adaptive actions within human systems will likely moderate the harmful effects and exploit whatever benefits that may arise from climate change. In addition to the fact that some adaptive actions may later turn out to be maladaptive; there is also increasing recognition that adaptation is not solely contingent on adaptive actions but is also influenced by non-climatic factors and actions (Fussel, 2007; Kelly & Adger, 1999; Moser & Ekstrom, 2010).

A salient feature of the IPCC's (2014c) definition of climate change adaptation, as well as other definitions of adaptation put forward in the literature, is the emphasis on systems as the object of adaptation. This is reflected in Fussel's (2007, p. 1) definition of adaptation as "actions targeted at the vulnerable system in response to actual or expected climate stimuli with the objective of moderating harm from climate change or exploiting opportunities." Systems theory also features strongly in the context of human adaptation which is described by Smit & Wandel (2006, p. 282) as "a process, action or outcome in a system [individuals, household, community, group, sector, region, country] for the system to better cope with, manage or adjust to some changing condition, stress, hazard, risk or opportunity".

Human forms of adaptation to climate change is not a new phenomenon. Societies have always autonomously adapted to a range of environmental stimuli, which is inclusive of but not limited to climate change (Fussel, 2007). What is new is the emphasis that is being given to planned adaptation which is considered necessary to address future climate change. Climate trends suggest that future climate change is likely to be beyond the collective experience and existing adaptive capacity of societies (Dovers & Hezri, 2010; Haasnoot et al., 2013; Hallegatte, 2009); hence the need for planned adaptation.

2.2.3 Adaptive Capacity

The potential for adaptation is described as adaptive capacity, which Adger (2006, p. 270) defines as "the ability of a system to evolve in order to accommodate environmental hazards, or policy change, and to expand the range of variability with which it can cope". There is a given range of climate stress to which a system can adapt to. This is referred to as the coping range (Fussel, 2007). At any given point in time, the limit of this range constitutes the threshold

or maximum point at which a system will be able to cope based on its existing capabilities. When a system surpasses this point, it is referred to as the adaptation tipping point (Kwadijk et al., 2010), and new policy changes and interventions will be needed in order to adapt to the new conditions. Successful implementation of new adaption policies and measures in response to or in anticipation of extreme climatic events will increase the adaptive capacity and the coping range of a system (Adger, 2006; Fussel, 2007). Conversely, failed or weak policies will decrease adaptive capacity. Policy as a central factor in constraining or enhancing adaptive capacity expands the analysis beyond being able to adjust to the physical impacts of climate change to include the role of governance across all scales of adaptation planning. Like contextualized vulnerability, adaptive capacity is not static, but dynamic. Good governance, social capital, robust and flexible institutions represent a common pool of factors that determine adaptive capacity, vulnerability, and resilience (Engle, 2011).

Adaptive capacity is linked to the access individuals and communities have to the resources that are needed for adaptation. Such access or entitlement (Adger & Kelly, 1999; Pelling, 2011a) is characterized by unequal power arrangements, which account for differences in adaptive capacity among individuals and local communities. Access to resources is critical to move adaptive capacity beyond policy making to meaningful implementation (Burch & Robinson, 2007). While the literature frames the building of adaptive capacity mainly as a localized activity enabled by participatory forms of governance, the nested structure of planning suggests that attention should also be paid to issues of scales. Adaptive capacity at lower scales is considerably shaped by actions at higher scales (Nalau, Preston, & Maloney, 2015). This recognition calls for methods of assessing adaptive capacity from an integrated perspective which is not preoccupied with any given scale of planning per se, but which seeks to harness the

multiple capabilities that exist across the different scales of planning and bring them to bear on enhancing the adaptive capacity of the entire planning system.

2.2.4 Resilience

A corollary to adaptive capacity is the concept of resilience. The concept of resilience with its focus on how systems withstand shocks and disturbances is increasingly becoming part of the lexicon of climate change adaptation, but to date, its meaning and application remains highly contested. Resilience is rooted in ecology (Holling, 1973) and was later applied to the social dimensions of society. While there are slight definitional nuances, resilience is generally thought of as the ability of a system to essentially retain its key functions despite climatic perturbations by self-reorganizing and adjustment (Adger et al., 2011; Davoudi, 2012; Walker et al., 2004). Resilience is dependent on the interplay of several factors and should, therefore, be assessed from a systems perspective, as opposed to looking at the individual elements within a system (Adger et al., 2011; Folke et al., 2010).

Resilience is more widely discussed in theoretical than practical terms. Recent approaches to climate resilience emphasize being able to withstand on-going changes within interconnected natural and man-made systems. Resilience embraces the seemingly conflicting idea of systems being both flexible and robust in response to climate change (Adger et al., 2011; Davoudi, 2012; Funfgeld & McEvoy, 2012). Flexibility as a characteristic of resilient systems comes from an understanding of how natural systems behave in response to stress (Gunderson & Holling 2002). Flexibility requires systems to be able to ‘bounce back’ to their original state or ‘bounce forward’, i.e. to adjust to a new state in response to climatic shocks. This understanding of resilience is termed ecological resilience. Robustness is allied to the concept of engineering

resilience and was originally used largely in reference to man-made systems (Davoudi, 2012; Funfgeld & McEvoy, 2012). Robustness or stability implies systems being able to withstand disturbances and maintain their original functions despite climatic shocks (Davoudi, 2012; Folke et al., 2010) and features strongly in disaster risk management (Djalante, Holley, & Thomalla, 2011). The central point embedded in the ideas of flexibility and robustness within resilience theory is that planning should enable interconnected natural and man-made systems to self-organize and maintain basic functionality in the face of climate stress.

Resilience, like adaptation, is a process and not an outcome (IPCC, 2014b). The adaptation pathway chosen within any given planning locale implicitly or explicitly reflects the notions of ecological or engineering resilience. The use of hard adaptation measures namely breakwater, dykes, and levees to enhance resilience and reduce vulnerability against sea level rise and storm surge is common in low-lying coastal communities. The permanent nature of these hard structures and the potentially irreversible changes that they might create within the local environment suggest that they should be utilized as last resort (Mercer, Kelman, Alfthan, & Kurvits, 2012, Sovacool, 2011). Over-reliance on engineered coastal defenses to safeguard against vulnerability can have catastrophic results as demonstrated in the massive flooding of New Orleans in the aftermath of hurricane Katrina (Glantz, 2005). Faced with the same problems of sea level rise and storm surge, the use of soft measures such as no development zones in extremely low-lying coastal areas, beach nourishment, and coastal wetland rehabilitation can also reduce vulnerability and enhance resilience. These measures are usually associated with an ecosystem-based approach to adaptation, which focuses on the use of biodiversity and ecosystem services to help local communities adapt to the adverse effects of climate change (Khan & Amelie, 2015; Mercer et al, 2012; Reid, 2015). Such measures facilitate on-going adjustments

and changes in keeping with natural coastal environmental processes. For example, coastal wetlands serve as a catchment for terrestrial run-off, as well as a buffer against storm surge.

Various attempts at creating analytical frameworks for measuring resilience against climate change focus on common qualitative proxy indicators that can be applied within the context of sustainability. They are considered as proxy indicators because they are not directly linked to climate change adaptation, but to broader issues of governance and sustainable development. These loosely interrelated indicators include: the capacity for on-going learning and change, diversity, flexibility, adaptive governance structures, shared learning and innovation (Armitage, 2008; da Silva, Kernaghan, & Luque, 2012; Leichenko, 2011; Tyler & Moench, 2012). A collective analysis of these indicators offers the best available insight into resilience. Despite being embryonic in its development, resilience theory provides insight into assessing the potential of cities to deal with the risks associated with climate change. There is widespread acknowledgment in the literature that creating resilient systems provides the best safeguard against the uncertainties associated with climate change. Several authors have embraced resilience as the ultimate goal of adaptation (Adger et al., 2011; Berkes & Ross, 2013; Folke et al., 2010; Leichenko, 2011; Tyler & Moench, 2012). The notion of building resilient communities is a central theme within sustainable development planning and is increasingly being emphasized in development plans and policies.

2.3 Adaptation Planning Process

Adaptation planning in a broad sense speaks to the process of developing a comprehensive adaptation plan or mainstreaming adaptation measures into existing sectoral policies. More recently, use of the term adaptation planning has been largely associated with

attempts at developing comprehensive adaptation plans (Baynham & Stevens, 2014; Nordgren et al., 2016; Moser & Ekstrom, 2010; Preston et al., 2011; Tang, Brody, Quinn, Chang, & Wei, 2010; Wheeler, 2008). Though not widespread, these attempts at developing comprehensive adaptation plans are primarily taking place at the municipal level in developed countries. Conversely, the concept of mainstreaming, though globally recognized, is largely confined to developing countries in the global south where there is an urgent need for sustainable development to reduce vulnerability to climate change (Agrawal & Aalst, 2008; Cuevas, 2016; Janetos, Malone, Mastrangelo, Hardee, & Bremond, 2012; Klein et al., 2007; Reid & Huq, 2014; Schipper, 2007). The rationale behind mainstreaming climate change adaptation is that to be effective, adaptation measures must be integrated horizontally across different climate-sensitive sectors, as well as vertically across different administrative levels. In addition, it is counterproductive to create an entire separate planning framework solely for the purpose of addressing climate change. In SIDS and the wider developing world where planning capacity is limited, mainstreaming provides an opportunity to integrate climate change into established policy domains, without necessarily reinventing the wheel.

For adaptation planning to be effective, certain prerequisites are necessary. Fussel (2007) identifies the following prerequisites:

i) Awareness of the problem;

ii) Availability of effective adaptation measures;

iii) Information about these measures;

iv) Availability of resources for implementing these measures;

v) Cultural acceptability of these measures;

vi) Incentives for implementing these measures.

Practical real-world constraints mean that all these prerequisites are unlikely to be met, necessitating the development of strategies to overcome the barriers to adaptation (Burch, 2010; Mills et al., 2015). Adaptation planning in practice is often driven by extreme events (Amundsen, Berglund, & Westskog, 2010; Serrao-Neumann, Crick, Harman, Schuch, & Choy, 2015), which mean that many adaptation measures tend to be reactive and are implemented in isolation of a strategic plan. Such a patchwork approach to adaptation planning lacks coherency. A reactive approach to adaptation policy making may also lead to the creation of inefficient policies. This increases the likelihood of maladaptation as policies are being assessed in a singular manner, instead of examining their cumulative effects within a scalar context that involves multiple temporal and spatial scales, as well as stakeholders (Adger et al., 2005)

2.3.1 Adaptation Entry Points

Identifying appropriate entry points for adaptation is important to advancing planned adaptation (Eisenack et al., 2014). Addressing present climatic hazards and vulnerability within local communities in SIDS and elsewhere is widely considered as a starting point for long-term climate change adaptation, as well as scaling up best practices into national-level adaptation planning (Conway & Mustelin, 2014; Kelman, 2014; Pelling 2011b; Smit & Wandel, 2006). New adaptation research, focusing on American municipalities (see Lyles et al., 2017) suggests that given the limited adaptive capacity which exists, planners should first focus their resources and effort on building adaptive capacity in niche areas or sectors, rather than trying to address all the dimensions of adaptation at once. This proposition, although not extensively researched, makes plausible sense in the context of SIDS where resource constraints and weak governance severely limit adaptation. Local community engagement is also an entry or starting point for

identifying local vulnerabilities, adaptation priorities, existing capacity, and shaping the adaptation policy agenda (Conway & Mustelin, 2014; Dodman & Mitlin, 2013; Smit & Wandel, 2006). Identifying adaptation entry points is primarily intended to kick-start the adaptation planning process. This is not sufficient to ensure that all the barriers to adaptation are addressed but is useful in creating a roadmap for adaptation.

2.3.2 Influence of the Rational Planning Model in Adaptation Planning

To advance the adaptation planning process, technical guides have been created by various development related entities such as the United Nations Development Programme (UNDP), the United Kingdom Climate Impacts Programme (UKCIP), among others (see Lim, Spanger-Siegfried, Burton, Malone, & Huq 2004; Willows & Connell, 2003). The emphasis is on providing practical guidance to policy makers regarding the principles and steps which underpin the adaptation planning process. A key feature of the various guides to adaptation planning, both in the grey and academic literature, is that the process involves a series of circular iterative steps with multiple feedback loops – much like a modified version of the conventional rational planning process. The precise number of steps varies depending on the specific adaptation context, but the process typically encapsulates the following:

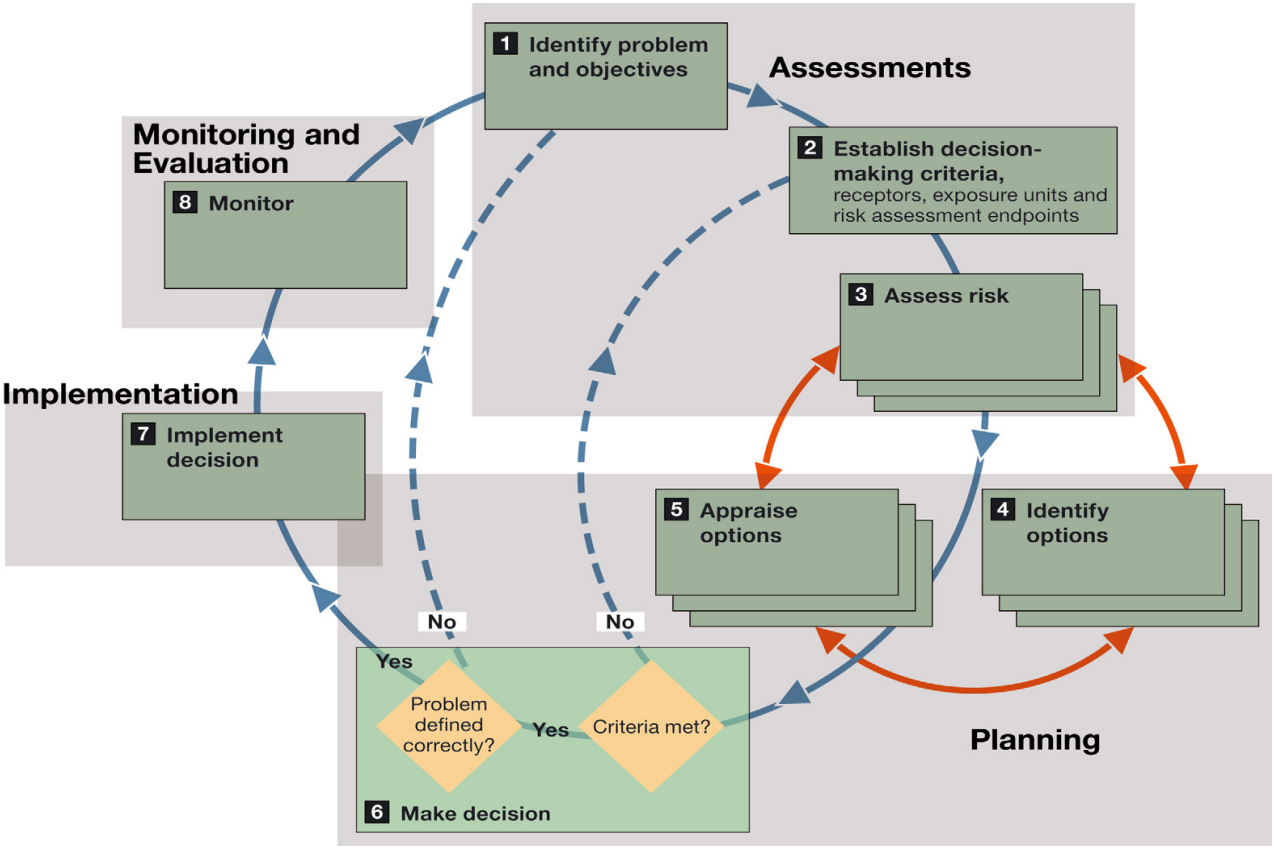
- Problem identification and goal setting in which the challenges posed by climate change are identified and the goals of adaptation are determined;
- Assessment of current and future risk, vulnerability, and potential opportunities;
- Developing and appraising adaptation policies and strategies;
- Prioritizing adaptation interventions;
- Implementation;

- Monitoring and evaluation (Hanger, Pfenninger, Dreyfus, & Patt, 2013; Mimura et al., 2014; Preston et al., 2011; Willows & Connell, 2003).

The steps outlined above highlight the ubiquitous influence of the rational model in adaptation planning. As outlined in Figure 2.1, adaptation planning shares the core features of the rational model, albeit with a more defined focus. The influence of the rational model in adaptation planning can be attributed to its continued longstanding use in public policy making, notwithstanding the model being criticized as rigid, linear, and simplistic (see Huxley & Yiftachel, 2000; Innes & Booher, 2010; Potts et al., 2014; Taylor, 1998). Ideally, cross-cutting issues such as stakeholder engagement, assessing and enhancing adaptive are addressed throughout the various steps involved in the adaptation planning process so as to help give legitimacy to the process. Likewise, various descriptive and analytical planning tools are used throughout the different steps of the adaptation planning process. For example, scenario modelling and visualizations can be used to assess future vulnerability (Burch, 2010; Bennett, Kadfak, & 2016), while appraising adaptation policies and strategies may involve the use of Cost Benefit Analysis (CBA), Multicriteria Analysis (MCA), or qualitative expert judgement (Ellen, Yager, Hanson, & Bosher, 2016).

The complexity involved in adaptation planning is of such that multiple steps are often merged, undertaken concurrently, or skipped altogether (Yuen, Jovicich, & Preston, 2013). Recent assessments of adaptation planning practice indicate that considerable progress is being made in meeting the early phases of adaptation, e.g. conducting vulnerability assessments and creating adaptation plans, but is lagging behind with regards to implementation, monitoring and evaluation of adaptation activities (IPCC, 2014a; Nordgren et al., 2015).

Figure 2.1 Adaptation Planning Process



Source: Willows & Connell 2003

2.4 Multi-scalar Dimensions of Adaptation Planning

Traditional discourse on climate change adaptation primarily frames the issue as a local problem that should be addressed at the community level where the drivers and impact of climate change are mostly manifested and where they are felt the greatest (Lindseth, 2005; Matthews; 2013; Measham et al., 2011; Smit & Wandel, 2006). This traditional perspective of adaptation is increasingly being challenged by the view that adaptation is too big a problem for any one level of planning. The emerging view is that adaptation should be shared across different scales of governance, including transnational boundaries, which consider the impacts of adaptation beyond national borders (Adger et al., 2005; Daniell et al., 2011; Dzebo & Stripple, 2015;

Funfgeld, 2015; Nalau et al., 2015; Urwin & Jordan, 2008). Local adaptation can be enhanced or constrained by actions at higher scales of governance (Amundsen et al., 2010; Measham et al., 2011). This is because local communities are linked to broader regional, national and international systems through various economic and social networks that channel the flow of resources and information necessary to support adaptation. Similarly, adaptation at higher scales is also partially dependent on local action.

Decentralization of adaptation policy making to the lowest possible level of planning, closest to where the impacts of climate change are being felt (i.e. the subsidiarity principle), does not always match the resources available at the lowest level to undertake the task (Bulkeley, 2013; Giest, 2014; Measham et al., 2011). The policy framework within which local government operates is subsumed within national policies. Local government is often tasked with the responsibility of implementing actions, which are defined at higher levels of government, with little or no room to maneuver (Amundsen et al., 2010; Measham et al., 2011). Through the creation of cross-scale networks, local actors have been able to circumvent some of the limitations which the hierarchical structure of planning places on them. This is resulting in a gradual re-scaling of state power, political representation, and policy determination (Cowell & Owens, 2006; Juhola & Westerhoff, 2011). The need for a multi-scalar approach to adaptation planning is also borne out of the fact that climate change impacts are not confined to administrative or planning boundaries (Lundqvist, 2015), but rather to socio-ecological systems that transcend all levels of planning. Likewise, barriers and constraints to adaptation exist at different spatial and temporal scales and are not confined by administrative planning boundaries.

2.5 Tools for Adaptation Planning

Situating adaptation planning within the broader realm of public policy making for sustainable development provides an opportunity to utilize a wide array of tools and public policy instruments, which can be used to advance adaptation (see Henstra, 2016; Macintosh, Foerster, & McDonald (2015). Adaptation planning tools are intended to address various barriers that constrain the adaptation policy-making process. The tools that are used in adaptation planning are not unique to that policy domain, but are conventional planning tools such as forecasting, cost-benefit analysis, multi-criteria analysis, environmental impact assessment, taxation, zoning, building codes, strategic environmental assessment, etc (Bina, 2007; Ellen et al., 2016; Henstra, 2016; Hodge & Gordon, 2014). There is also climate vulnerability assessment, as well as, various risk screening tools that are specifically designed to respond to challenges of climate change adaptation and mitigation. The choice of tool depends on the nature and scope the problem being addressed.

The quintessential purpose or function of adaptation planning tools is that they should help us to better incorporate or mainstream climate change consideration into decision making at different levels of planning and across multiple spheres of governance. The hope is that by mainstreaming adaptation into decision making, we can eventually reduce vulnerability and build a resilient society. Using the Caribbean Climate Online Risk and Adaptation tool (CCORAL) as an example, this tool developed by the Caribbean Community Climate Change Centre functions as risk screening tool which can be used by policy makers and project managers to incorporate climate risk management into their decision making (CCCCC, 2013).

Table 2.1 Planning Tools and Mechanisms for Mainstreaming Climate Change Adaptation

Mechanisms	Examples
1. Regulatory Tools	Zoning development away from vulnerable areas, creation of buffer zones and protected areas to maintain ecosystem services
Land use / Zoning Plans	
Development Control	Coastal setbacks, site development standards
Urban Design Standards	Building codes to incorporate design for future climate impacts, use of non-structural and structural measures to protect against climate hazards, e.g. flooding, storms, etc.
2. Land Use Analytics	Scenarios for land use conversion are defined to accommodate future population changes and projected climate change threats
Land use Capability	
2. Urban Services	Strengthening municipal delivery and management of critical urban services e.g. water, sewerage, and waste disposal, to reduce the risk of system failure and support sustainable human settlements
3. Civic Engagement	Focus group discussions, design charrettes, town hall meeting to garner local input into the design of adaptation policy (i.e. adaptation pathways)
Public Participation in the Planning Process	
4. Fiscal Tools	Tax rebates to promote the preservation of greenfield sites and encourage grey-field redevelopment
Property Taxes	
Development Charges	Use of development fees to offset the cost of adapting infrastructure to green technologies
Private Public Partnerships	Securing private financing for critical investments in public transit and renewable energy to reduce CO2 emissions. Joint implementation of adaptation related policies and projects with local NGOs and CBOs

Source: Created by author with data from (Matthews, 2013; Sarrao-Neumann et al 2015; Wilson 2010)

Table 2.1 outlines some of the various planning tools and mechanisms which can be used to support the mainstreaming of climate change adaptation and mitigation. Though not exclusive to adaptation and mitigation planning, these mechanisms if effectively used can shape development in ways that limit exposure, sensitivity and vulnerability to climate change (Matthews, 2012; Wilson, 2006). These planning tools are critical to the uptake of adaptation and mitigation measures into local development control standards that are legally enforceable. The mandatory enforcement of development control standards functions as a quality assurance mechanism for entrenching adaptation measures into local development planning.

2.6 Adaptation Planning in SIDS

It is widely recognized that climate change adaptation is not isolated from other decisions, but occurs within a broader demographic, social, and economic context. Consequently, climate change adaptation within SIDS and the wider developing world is incorporated into an overarching framework for risk reduction, sustainable development, resource and environmental management (Ayers & Huq, 2009; Janetos et al., 2012; Mercer, 2010; Pelling, 2011b; Reid., 2015; Schipper, 2007). The adaptation planning literature points to a multiplicity of approaches to adaptation that are utilized in SIDS, e.g. risk-hazard model, community-based adaptation, ecosystem-based adaptation, community-based natural resource management, scenario planning, and sustainability planning (see Khan & Amelie, 2015; Mercer, 2010; Mercer et al., 2012; Janetos et al., 2012; Reid, 2015; Schipper, 2007; Tompkins 2005). These approaches are not discrete. There are considerable overlaps which make a differentiation between the approaches fuzzy in practice. Two salient themes or areas of consensus which emanate from the adaptation planning literature on SIDS are that adaptation efforts should seek to reduce vulnerability to climate change impacts, while simultaneously promoting local and national sustainable development. Taken from this perspective, adaptation planning in SIDS can be examined in terms of those approaches which emphasize disaster risk reduction as the primary response to climate change vis-à-vis approaches which emphasize the pursuit of sustainable development as the primary strategy for building adaptive capacity to address climate change.

2.6.1 Disaster Risk Reduction

Adaptation-related policies, plans, programs, and projects within SIDS have been conventionally fashioned within a disaster risk reduction conceptual framework. This is largely

in response to the inevitable threats of climatic hazards namely sea level rise, increased tropical storms, drought, and flooding (Lopez-Marrero & Wisner, 2012; Mercer, 2010; Pelling, 2011b; Tompkins, 2005; Voccia, 2012). As a result, adaptation strategies start with a detailed assessment of expected climatic hazards and stressors in order to derive hazard specific adaptation strategies and measures. This approach to adaptation planning has traditionally been undertaken in a top-down manner. Kelly and Adger (2000, p. 326) define top-down adaptation as: "The end point of a sequence of analyses beginning with projections of future emission trends, moving on to the development of climate scenarios, and thence to biophysical impact studies and the identification of adaptive options". Top-down approaches to adaptation rely heavily on future climate predictions derived from climate models based on greenhouse gas emissions. However, effectively downscaling global and regional climate models to the level of individual SIDS where strategic adaptation-related decisions are made continues to prove challenging, despite improvements in the resolution of climate models (Campbell, Taylor, Stephenson, Watson, & Whyte, 2011). In addition, even though most SIDS are confronted by the same types of climatic hazards, there is the factor of differential vulnerability in that exposure and sensitivity differ among local communities (Lopez & Wisner, 2012; Rhiney, 2015). These challenges have led to the use of bottom-up oriented approaches such as local flood hazard mapping to assess physical vulnerability to climate change in SIDS at scales which are more appropriate to inform adaptation decision making. For example, Weis et al., (2016) employed a participatory approach using Geographic Information Systems (GIS) to spatially represent vulnerability to flooding in the Caribbean island of Grenada. The results showed that vulnerability to flooding, and the adaptive capacity to respond, is unevenly distributed thereby necessitating the use different adaptation strategies across local communities. A similar study

was also undertaken in the island of Martinique where Schleupner (2007) examined the impact and vulnerability to sea level rise using GIS models. The results which showed that one-fifth of the island is likely to suffer from flooding due to sea level rise. The dominance of the risk-hazard model in adaptation planning in SIDS can be attributed to the fact that it is generally easier to identify and relate to the physical dimensions of climate change through exposure to extreme weather events, as opposed to the underlying socio-economic factors which influence spatial patterns of exposure and vulnerability (Bennett, Blythe, Tyler, & Ban, 2016; Lata & Nunn, 2012).

Disaster risk reduction efforts, particularly in Caribbean SIDS, take several forms. At the national level, it includes strengthening environmental and planning regulations to better address climate change impacts in the formal planning process. It also includes creating new organizational entities with mandates to address issues related to climate change (Middelbeek, Kolle, & Verrest 2014; Tompkins, 2005; Scobie, 2016). At the local or community level, disaster risk reduction is largely built around various project interventions involving partnerships with local stakeholders (Pelling, 2011b; Sovacool, 2012). In developing disaster risk reduction and disaster risk management strategies, many SIDS have taken an incremental learning-by-doing approach which embraces the principles of adaptive management, the promotion of self-efficacy, and the use of formal and informal networks to influence local adaptation planning (Sovacool, 2012; Tompkins, 2005; Wise et al., 2014).

2.6.2 Developmental Approach

Although it is pragmatic for SIDS to approach adaptation planning from a disaster risk reduction perspective, given the severity of climate risks which they face, Mimura et al., (2014) note that

the most attractive adaptation options offer development benefits in the short term as well as reducing vulnerability in the long term. This is because climate change adaptation is inextricably linked to sustainable development, as many of the determinants of adaptive capacity are also prerequisites for sustainable development. Effective institutional and governance arrangements, social capital, availability and access to relevant climate change information by stakeholders, adequate financial, technical, and human resources are factors that determine adaptive capacity as well as promote sustainable development (Engle, 2011; Hogarth & Wojcik, 2016; Smit & Wandel, 2006; Williams, Fenton, & Huq, 2015). Strategies for climate change adaptation and sustainable development are therefore mutually reinforcing. From a developmental perspective, climate change adaptation is viewed as a central pillar of national and local development strategies. The threat of climate change is considered to be inherently linked to all aspects of development planning (Cole, 2008; Janetos et al., 2012; Schipper, 2007). Consequently, climate change adaptation is not merely seen as a solution to existing development problems, but as a pathway to sustainable development (Bishop & Payne, 2012; Schipper, 2007; Wise et al., 2014). Of critical importance is that adaptation is considered as part of the wider development planning process to reduce social vulnerability to climate change (Forsyth, 2013).

It is well established that SIDS face certain long-term developmental challenges such as high levels of poverty, poorly developed economies, inequality, natural resource dependent livelihoods, inadequate human, and financial and technical resources (Bishop & Payne, 2012; Douglas, 2006; Dulal, Shah, & Ahmad, 2009; Pelling & Uitto, 2001; Wong; 2011). Juxtapose these developmental challenges with the effects of climate change and SIDS are placed in the tough position of prioritizing the use of their minimal resources to attend to immediate needs such as poverty alleviation, economic growth, and improving living standards, vis-à-vis long-

term climate change adaptation. Hence, sustainable development priorities in SIDS and the wider developing world tend to focus heavily on resource management in terms of immediate livelihoods and quality of life needs (Butler et al., 2014; Douglas, 2006; Mercer et al, 2012; Tanner et al., 2015). Rather than pitting adaptation against the immediate development needs of SIDS, the adaptation planning literature rightly suggests that focus should be on developing the requisite adaptive capacity within SIDS to jointly address both climate change and other development challenges (Bishop & Payne, 2012; Kelman, 2014; Ranger & Garbett-Shiels, 2012; Schipper, 2007). The principal benefit or rationale for the use of a developmental approach to adaptation in SIDS and other developing countries is that sustainable development is an effective no-regret adaptation option which reduces socio-economic vulnerability and enhances resilience to climate change (Ranger & Garbett-Shiels, 2012; Forsyth, 2013; Klein et al., 2007). Furthermore, mainstreaming climate change adaptation into development planning ensures the long-term sustainability of investments by reducing the sensitivity of present and future development to climate change impacts (Klein et al. 2007).

2.6.3 Bottom-up Approaches

Owing to the need to build local adaptive capacity in SIDS, bottom-up approaches to adaptation are highly encouraged (Betzold, 2015; Butcher-Gollach, 2015; Kelman & West, 2009; Khan & Amelie, 2015; Spires et al., 2014). Bottom-up approaches to adaptation predominantly focus on the underlying factors which cause communities, households, and individuals to be vulnerable to the effects of climate change. These include: poverty, poor land use practices, inequality, lack of information, as well as weak institutional and governance arrangements (Brouwer, Akter, Brander, & Haque, 2007; Brown, Gawith, Lonsdale, & Pringle, 2011; McLeod et al., 2015; Pelling, 2011a; Smit & Wandel, 2006). A bottom-up approach to adaptation assumes

that addressing the factors which give rise to current vulnerability and the lack of adaptive capacity, invariably reduces future vulnerability to climate change. Given the uncertainty regarding the precisely localized impacts of future climate change scenarios, and whether or not our adaptation efforts will yield the intended results (see Haasnoot et al., 2013), bottom-up approaches to adaptation are deemed to be more flexible in response to climatic uncertainties.

Two of the most widespread forms of bottom-up adaptation being encouraged in SIDS are ecosystem and community-based adaptation. Ecosystem-based adaptation (EbA) promotes the sustainable use of biodiversity and ecosystem services to help support local livelihoods, build resilience, and reduce vulnerability to the adverse effects of climate change (Khan & Ameile, 2015; Mercer et al., 2012; Reid, 2015). Community-based adaptation (CBA) shares a local focus with EbA but emphasize a community-led or driven adaptation planning process which seeks to strengthen the capacity of local people to plan for and cope with the adverse impacts of climate change by utilizing community knowledge and resources to address local development concerns which underlie their vulnerability (Archer et al., 2014; Reid, 2015). CBA is based on the premise that communities have the requisite skills, experience, and local knowledge, or the potential to develop such skills that are needed to undertake appropriate local adaptation planning (Dodman & Mitlin, 2013; Nunn, Aalbersberg, Lata, & Gwilliam, 2014). However, the architecture necessary for pursuing CBA, i.e. local community leaders, strong informal networks and governance arrangements, vibrant civil society, and NGO groups, are not always present in local communities (Dodman & Mitlin, 2013). Nonetheless, proponents of CBA point to its potential usefulness in promoting local development and social equity considerations by ensuring that the interest of the most vulnerable is included in the adaptation planning process (Dodman & Mitlin, 2013; Dulal et al., 2009; Spires et al., 2014). Similar sentiments are also expressed by Nurse et al

(2014) who argue for greater application of the principles of CBA in SIDS to jointly tackled climate change adaptation along with issues such as poverty.

Given the high dependence of SIDS on natural resources and having healthy ecosystems to sustain local livelihoods and key economic sectors such as tourism, agriculture, and fisheries, EbA is considered as a viable pathway for pursuing sustainable development (Khan & Amelie 2015; Mercer et al., 2012; Reid, 2015). Within the context of SIDS, financial resources to support adaptation is very limited and heavily reliant on international funding (see Medeiros, Hove, Keller, Echeverria, & Parry, 2011; Robinson & Dornan, 2017; Sovacool, 2012). This necessitates the use of effective low-cost and self-sustaining adaptation measures. For example, an ecosystem-based approach to adaptation such as the use of natural buffers to protect against coastal erosion and sea level rise is more cost-effective than building hard engineered structures which must also be maintained over time (Dhar & Khirfan, 2016; Khan & Amelie, 2015; Mercer et al., 2012; Sovacool, 2011). In addition to being more compatible with nature, EbA measures also encourage a flexible approach to adaptation planning which is necessary to deal with the inherent uncertainties associated with climate change adaptation. For example, hard engineered coastal defenses can be irreparably breached during unexpected extreme weather events, while natural defenses such as mangroves can self-rejuvenate after being damaged. However, as noted by Sovacool (2012), political leaders often demonstrate a bias towards the use of hard adaptation measures because their pronounced visibility often serves as a political selling point to their constituents that something tangible is being done to address climate change.

Efforts at EbA and CBA in SIDS are usually undertaken as part international donor-funded projects (Medeiros et al., 2011; Sovacool, 2012; Spires et al., 2014). Examples of EbA and CBA reflect context-specific adaption responses. Some EbA projects are confined to risk and

vulnerability assessments, while others focus on implementation measures. The actual integration or mainstreaming of EbA and CBA approaches into adaptation planning on an on-going or sustained basis remains a challenge due to: short-term thinking, inconsistent political commitment, and competing domestic priorities (Khan & Amelie 2015; Mercer et al., 2012; Sovacool et al., 2012; Spires et al., 2014). In other words, EbA and CBA as currently practiced in SIDS is ad hoc and lack uniformity in terms of being integrated into strategic adaptation planning frameworks. This has prompted research into how best to vertically 'scale up' EbA and CBA into national-level planning, as well as horizontally 'scale out' or replicate these bottom-up approaches across local communities (see Archer et al., 2014; McLeod et al., 2015; Khan & Amelie, 2015; Reid & Huq, 2014).

2.6.4 Best Practices in Adaptation Planning Within SIDS

Best practices in adaptation planning is primarily determined by the local context in which adaptation takes place (Betzold, 2015; Kelman & West, 2009; Middelbeek et al., 2014; Schreus, 2008; Smit & Wandel, 2006), notwithstanding that actions at higher levels of planning can enhance or constrain local adaptation. While the adaptation planning literature places a strong emphasis on localized bottom-up approaches to adaptation, a bottom-up approach is not necessarily synonymous with best practice (see Dodman & Mitlin, 2013). Unequal power arrangements among local stakeholders mean that voices on the ground may not be democratically or accurately portrayed in what is intended to be a deliberative and participatory adaptation planning process (see Sovacool, Linner, & Goodsite, 2015; Tanner & Allouche, 2011). Best practice, therefore, involves a pragmatic blend of top-down and bottom-up approaches to fit a given adaptation context.

Table 2.2 provides a list of guiding principles which can be used to assess the extent to which adaptation initiatives constitute best practice, within the context of SIDS and the wider developing world. The principles do not reflect the current state of adaptation in SIDS, but rather speak to the factors which the literature deemed necessary for successful adaptation in SIDS.

Table 2.2 Guiding Principles for Best Practice in Adaptation Planning in SIDS

Principles	Explanation	Reference
Integrated planning	Adaptation policies should be vertically integrated into different levels of planning and horizontally across multiple climate-sensitive socio-economic sectors.	Adger et al., 2005; Conway & Mustelin (2014); Nalau et al., 2015.
Flexible and robust policies	Adaptation policies should be amendable to unforeseen changes, as well as be able to perform under a range of projected future climate scenarios.	Bhave et al., (2016); Ranger & Garbett-Shiels (2012).
Support local development and livelihoods	Adaptation should offer development benefits to local communities in the short-term, as well as reduce long-term vulnerability to climate change.	Janetos et al., 2012; Mimura et al., 2014); Schipper, 2007.
Participatory multi-stakeholder engagement	The widest possible range of stakeholders, particularly local stakeholders, should be meaningfully involved in the all the stages of the adaptation planning process.	Few et al., 2007; Tompkins et al., 2008
Combine indigenous knowledge with scientific knowledge	Local traditional knowledge should be integrated with other forms of knowledge to fill existing knowledge gaps on climate change adaptation.	Kelman & West, 2009; Williams et al., 2015.
Build local adaptive capacity & resilience to climate change	Adaptation initiatives should create or strengthen the capacity of local communities to reduce and withstand the adverse impacts of climate change.	Middelbeek et al., 2014; Sovacool, 2012, Tompkins, 2005.
Protect and conserve local environmental resources	Adaptation should promote the sustainable use of natural resources, protect ecosystem services to support local livelihoods, build resilience, and reduce vulnerability to the adverse effects of climate change.	Khan & Ameile, 2015; Mercer et al., 2012; Reid, 2015.

2.7 Barriers to Adaptation Planning in SIDS

Adaptation planning is not a straightforward or linear process as sometimes depicted within adaptation planning frameworks. There are several barriers or impediments which can

constrain adaptation planning. Barriers to adaptation are generally understood as challenges and obstacles which constrain or impede the adaptation process (Eisenack et al., 2014; Moser & Ekstrom, 2010). Barriers to adaptation differ from limits to adaptation in that barriers are malleable obstacles which can be overcome with creative thinking, political will, effective resource allocation, as well as institutional and land use changes (Moser & Ekstrom, 2010). Conversely, limits to adaptation are absolute obstacles or thresholds beyond which a system cannot be secured from intolerable climate risks through adaptive actions (Adger et al., 2009; Klein et al., 2014).

Generally, most of the barriers to adaptation do not directly arise from climate change, but stem from the mechanisms through which adaptation policies are developed and implemented (process centred barriers), as well as the relationship among the various actors involved in the adaptation process, i.e. actor-centred barriers (see Biesbroek et al., 2013; Eisenack et al., 2014; Moser & Ekstrom, 2010). Several studies have expounded on the various barriers to adaptation. For example, Biesbroek et al., (2014); Dovers & Hezri (2010); Lawrence et al., (2015); Measham et al., (2011) examine the barriers to adaptation from an institutional and governance perspective. Adger et al., (2009); Jones & Boyd (2011) discuss social related barriers to adaptation. Some studies look at the barriers to adaptation in relation to specific approaches to adaptation planning (see Hamin et al., 2014; Kuruppu & Willie, 2015; Mills et al., 2015; Spires et al., 2014). Other studies examine barriers to adaptation in specific geographic regions, e.g. developed countries, coastal areas, and SIDS (Betzold, 2015; Bhave et al., 2016; Ford, Berrang-Ford, & Paterson, 2011; Gibbs, 2015; Kuruppu & Willie, 2015).

Existing studies on the barriers to adaptation largely focus on developed countries (see Biesbroek et al., 2011; Burch, 2010; Eisenack et al., 2014; Ekstrom & Moser, 2014; Ford et al.,

2011; Hamin et al., 2014; Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; Measham et al., 2011; Storbjork, 2010). Even though SIDS are most vulnerable to effects of climate change, relatively few studies directly provide a small island perspective on the barriers to adaptation, as well as comparisons among different island states and different island regions (see Betzold, 2015; Kuruppu & Willie, 2015; Lata & Nunn, 2012; Robinson, 2017; Spires et al., 2014). Governance, including the necessary institutions that are needed for effective policy making and implementation, is weak and underdeveloped in SIDS. This, in part, accounts for stronger adaptation planning in developed countries compared to SIDS. This gap in the academic literature means that there is limited empirical research which can be drawn on to help researchers and practitioners alike tackle the implementation deficit which exists with regards to adaptation planning in SIDS (see Mimura et al., 2014). Without addressing the barriers to adaptation in SIDS, they will continue to lag behind in their level of preparedness to handle the impacts of climate change, leading to a further widening of the adaptation deficit which presently exists.

In SIDS and other developing countries, resource constraints, institutional deficiencies, lack of awareness, cultural practices, and an overall lack of adaptive capacity are often cited as major barriers to adaptation (Betzold, 2015; Butcher-Gollach, 2015; Lata & Nunn, 2012; Robinson & Doran, 2017; Spires et al., 2014). International support for adaptation in SIDS is largely targeted at addressing the above barriers through various forms of financial and technical assistance (Robinson & Doran, 2017) offered by multilateral development agencies and international Non- Governmental Organizations (NGOs). It is, therefore, no surprise that adaptation planning in SIDS is largely funded by international donors. Consequently, adaptation activities largely occur when external funding is available, with national governments making in-

kind contributions. Where policies exist to address adaptation, the lack of resources stymies their implementation (Betzold, 2015), further contributing to a widening of the gap between actual and expected policy outcomes. An emerging trend in the SIDS literature is that the barriers to adaptation are primarily examined in terms of the factors which constrain the use of specific approaches to adaptation planning, e.g. CBA, EbA, adaptive governance, etc (see Bhave et al., 2016; Spires et al., 2014; Kuruppu & Wille, 2015; Mills et al., 2015). This enhances our understanding of the application of specific approaches to adaptation planning in SIDS. However, the barriers to adaptation in SIDS are not sufficiently examined in relation to actual planning processes (see Clar et al., 2013; Moser & Ekstrom, 2010) and development pathways.

2.7.1 Categorization of the Barriers to Adaptation

Several of the studies on the barriers to adaptation in SIDS and elsewhere are detailed context-specific case studies. Instead of focusing on the individual barriers identified by these studies, seven categories of related barriers are outlined below to facilitate greater ease of analysis. Similar categorization can also be found in the literature. The primary organizing principle in categorizing the barriers to adaptation is the degree of similarity and interrelatedness which exist among the barriers. The seven categories of barriers are - (1) resource constraints; (2) institutional and governance constraints; (3) perception and awareness; (4) communication and collaboration; (5) conflicting temporal and spatial scales; (6) Leadership; and (7) physical barriers. The categories are not discrete; there are considerable overlap and interdependency among the barriers to adaptation which makes it necessary to address them in a collective manner.

Resource Constraints

Inadequate financial, technical, and human resource constraints continue to feature high on the list of barriers to adaptation planning in SIDS (Betzold, 2015; Butcher-Gollach, 2015; Robinson & Doran, 2017; Spires et al., 2014). Financial, technical, and human resources are essential to the entire adaptation planning process. Technical resources such as scientific information and decision-making tools facilitate empirically driven adaptation policies. Skilled human resources are needed to undertake climate vulnerability assessments and formulate suitable adaptation policy. SIDS that are signatories to the UNFCCC can tap into global support and funding mechanisms for SIDS such as the Global Environmental Facility (GEF), Adaptation Fund, and Green Climate Fund (Bouwer & Aerts, 2006; Robinson & Doran, 2017). This has enabled SIDS to bolster their technical and human resource capacity by hiring international and local consultants to develop various adaptation policy frameworks, as part of internationally funded adaptation projects. Consequently, climate change financing is meeting the early stages of adaptation planning, e.g. conducting risk and vulnerability assessments, and creating adaptation policies, but is failing in the area of implementation, monitoring, and evaluation of adaptation activities (Nordgren et al., 2015; Robinson, 2017). Of the various resource constraints facing SIDS, inadequate financial resources to drive policy implementation at the local or community level is seriously lacking (Betzold, 2015; Pelling, 2011b; Robinson & Doran, 2017; Sovacool, 2012).

Institutional and Governance Constraints

The institutional and governance context for adaptation can be defined as the formal and informal rules, norms, and values which influence policy stakeholders in their decision making

on adaptation (Biesbroek, Klosterman, Termeer, & Kabat, 2014; Bulkeley, 2010; Dovers & Hezri, 2010). Both institutional void and institutional crowdedness exist in the local adaptation landscape within SIDS. Biesbroek et al (2011, p. 186) refer to institutional void as "a lack of institutions enabling, facilitating or stimulating adaptation to climate change." For example, many SIDS still have out-dated planning and environmental regulations dating back to their colonial past (See Home, 2013). Many SIDS also have no formal requirements for adaptation planning, but rather pursue adaptation on an ad hoc project basis (Pelling, 2011b; Sovacool, 2012; Spires et al., 2014). Institutional crowdedness exists when there is a multiplicity of regulations, organizational actors, and policies involved in adaptation decision-making with insufficient oversight and coordination leading to unclear and overlapping mandates, conflicting actions, and a fragmentation of local adaptation efforts (See Biesbroek et al., 2011; Scobie, 2016; Tompkins & Adger, 2002).

Policy integration is a major issue in adaptation planning. This is because planning is largely fragmented into silos or sectors, while adaptation is a cross-cutting issue, spanning all sectors and levels of planning (Adger et al., 2005). The integration of climate change adaptation policies across spatial, temporal and sectoral scales of planning is considered integral to successful adaptation. The harmonization of adaptation policies is necessary to prevent mismatches between high-level policy making and the coordination of local adaptation policies which may lead to maladaptation (Adger et al., 2005; Corfee-Morlot et al., 2009; Daniell et al., 2011; Gupta, 2007). In the absence of integrated planning mechanisms, it is difficult to coordinate adaptation efforts across multiple sectors to avoid conflicts which can thwart progress towards adaptation.

Formal mechanisms for enforcing planning regulations are weak and poorly developed in SIDS. Central governments with the aid of donor funding have created impressive legislation and policies, but lack effective enforcement. Many SIDS are multi-island states with far-flung remote islands. This, coupled with a general mistrust of government on the part of the public, makes top-down governance ineffective in promulgating and enforcing planning legislation (Betzold, 2015; Tompkins & Adger, 2002). In addition, there is a large informal sector in many SIDS. Considerable development takes place outside of the formal planning system without the requisite development control oversight (Butcher-Gollach, 2015). This has led to the proliferation of informal development which does not comply with regulatory standards.

Perception & Awareness

Social and political awareness of climate change is important for galvanizing support for adaptation among the public and other stakeholders at all levels within any society (Biesbroek et al., 2011). Assessing perception and awareness of climate change in SIDS can be strongly influenced by the use of language. Several studies show that locals in SIDS are not familiar with the concept of climate change as a technical terminology. However, they can identify and relate to the local impacts of climate change which are commonly ascribed to 'nature at work' or 'divine intervention' (Betzold, 2015; Lata & Nunn, 2012; Sovacool, 2012). This fatalistic outlook indirectly serves as a justification for inaction. Media and communication play a big role in creating awareness and shaping public perception of climate change. However, media involvement in sensitizing the public about climate change tends to be sporadic and triggered by extreme weather events (Lata & Nunn, 2012; Tompkins, 2005). Although all stakeholders need to be aware of the impacts of climate change, policy makers, and political leaders, given their pivotal role in adaptation planning, need to be very cognizant so as to be able to devise effective

policy solutions and make sound decisions (Jones et al., 2015; Sovacool, 2012; Spires et al., 2014). While some researchers argue that a lack of awareness about climate change among political leaders is a major cause of inaction (see Jones & Boyd, 2011; Lata & Nunn, 2012; Wise, 2014), there is also strong evidence to suggest that different values and priorities on the part of local politicians is a major contributory factor as well (Bhave et al., 2016, Butcher-Gollach, 2015; Sovacool, 2012).

Communication and Collaboration

Poor communication and collaboration among key actors is a cross-cutting barrier which hinders all stages of the adaptation planning process (Clar et al., 2013; Moser & Ekstrom, 2010). Key actors are not limited to politically elected or appointed decision makers, but also include locals, scientists, planning practitioners, the private sector, and NGOs who of necessity must interact within the same policy space (Biesbroek et al., 2011; Few et al., 2007). Poor communication and collaboration are often rooted in conflicting interests among stakeholders, and in ineffective institutional and governance arrangements. Rigid top-down bureaucratic structures and a silo approach towards planning does not facilitate horizontal and vertical cooperation among state and non-state actors in SIDS (Bhave, et al., 2016; Middelbeek et al., 2014). This makes it difficult to implement integrated and coherent adaptation policies. Poor communication and collaboration among state actors in SIDS have led to duplication of adaptation efforts on the part of government agencies that often compete for the same resources (Medeiros et al., 2011; Scobie, 2016). In SIDS where local government is very weak or non-existent, communication and collaboration between governments and local informal community groups to build local adaptive capacity and drive ‘on-the-ground’ adaptation is particularly challenging (Hogarth & Wojcik, 2016; Middelbeek et al., 2014; Wise, 2014).

Conflicting Scales

The political and policy agenda in SIDS is often dominated by immediate short-term issues which take priority over long-term climate change adaptation. The urgent need for poverty alleviation, job creation, economic growth and development in SIDS and the wider developing world has skewed the focus of planning towards short and medium-term costs and benefits at the expense of the long-term adaptation planning which is needed to create a resilient society (see Bhave et al., 2016; Jeuken & Reeder, 2011; Jones et al., 2015). Short-term political and planning cycles invariably do not coincide with long-term climate change projections. Projected climate change scenarios often range from 50 – 100 years (see Campbell et al., 2011; Moss et al., 2010). Adaptation involves balancing short-term planning and project cycles with long-term climate change impacts and projections (Eisenack et al., 2014; Jones et al., 2015). Short-term political and financial cycles mean that long-term adaptation decisions are less likely to be prioritized. This temporal disparity between planning and climate change adaptation is further compounded by the uncertainty of whether or not current adaptation measures will prove to be successful in the future. Policy makers are naturally less inclined to make definitive decisions in the face of uncertainty (Haasnoot et al., 2013; van Buuren et al., 2013), further delaying the adaptation process. In some instances, this temporal misfit has forced policy makers to employ an incremental approach to adaptation.

Leadership and Political Will

Leadership, including the lack of political will and commitment and the absence of policy entrepreneurs, is a major barrier to climate change adaptation. Lack of leadership is a barrier affecting all stages of the adaptation planning process (Biesbroek et al., 2011; Clar et al., 2013;

Eisenack et al., 2014; Hamin et al., 2014; Moser & Ekstrom, 2010), but is more pronounced in the agenda-setting stage where issues for policy consideration get prioritized. Even after policies have been adopted, leadership and resources are needed to ensure that they are meaningfully implemented (Clar et al., 2013). Leadership involves both state and non-state actors, the latter often playing the role of advocate and lobbyists – though sometimes partnering with state actors in the implementation process through public-private partnerships (Bauer & Steurer, 2014). Unless sufficiently powerful enough, non-state actors will find it very difficult to force the state into accelerating the adaptation that is needed to protect the poor and vulnerable within the population.

There is acknowledgment and political commitment on the part of national governments in SIDS to tackle climate change. This commitment is reflected in a growing suite of climate change policy instruments created with the help of international donor funding (Betzold, 2015; Hardee & Mutunga, 2010; Robinson, 2017). However, the extent of that political commitment beyond adhering to the requirements for obtaining donor funding has been called into question given the lax enforcement of policy, and the perception that more can be done despite the lack of resources to support implementation. Butcher-Gollach (2015) argues that there is very little political will or appetite for enforcement of planning regulations because it is not perceived as being directly tied to economic growth. Similar sentiments are also expressed by Lata and Nunn (2012), and Sovacool (2012) who opine that the stated commitment about climate change by national governments is not reflected in the on-the-ground development activities and natural resource management practices which exist locally.

Physical Barriers

Physical barriers arise when existing bio-physical systems, i.e. natural ecosystems, man-made infrastructure, and human settlements, are not resilient enough and are unable to cope with the adverse impacts of climate change (Adger et al., 2007; Spires et al., 2014). Physical barriers to adaptation are allied to the notion of thresholds. A threshold is a point at which changes in sensitive ecological or physical systems are likely to be irreversible (Hulme et al., 2007). Adaptation thresholds in the form of ecosystem destruction, species extinction, and loss of habit are identified in the ecology literature (Hulme et al., 2007). With regards to the built environment, extreme weather events continue to repeatedly show the vulnerability of existing infrastructure to climate change impacts (Adger & Barnett, 2009). Essentially, the worsening physical effects of climate change and the inability to cope and adapt lies at heart of the physical barriers to climate change.

2.7.2 Analytical Frameworks for Addressing the Barriers to Adaptation

While there is a burgeoning literature on the barriers to adaptation, very few studies such as Burch (2010), Eisenack et al., (2014); Moser and Ekstrom (2010); Ekstrom and Moser (2014) explicitly and systematically illustrate how to overcome perceived barriers to adaptation. These studies examine how different barriers to adaptation manifest themselves within the adaptation planning process and offer possible entry points for reducing or overcoming them. It is instructive to note that none of these studies are from a SIDS context. While the local adaptation context may differ, the adaptation planning process has certain universal commonalities which allow for meaningful insights to be drawn from outside of the SIDS context.

Burch (2010) illustrates how the use of the following five-step methodology can reverse past unsuccessful patterns of climate adaptation: 1) evaluate the system; 2) identify goals; 3) strategically tackle sources of path dependency; 4) evaluate progress; and 5) adaptively manage. Eisenack et al. (2014) seek to explain how the barriers to adaptation can be addressed by taking a holistic approach which focuses on the dynamic interrelationship among the barriers. Addressing the barriers to adaptation is an on-going process and not a one-off exercise. Moser and Ekstrom (2010) widely renowned diagnostic framework links the barriers to adaptation with the stages involved in a rational oriented adaptation planning process. The framework is pre-emptive in that it identifies the common barriers that are likely to arise during the different stages of the adaptation planning process, along with cross-cutting barriers which are common to all stages. The framework also proposes a matrix to help locate possible points of intervention to overcome identifiable barriers. The organizing principle behind the matrix is the source or origin of the barriers relative to the position, power, and influence of policy makers. It is assumed that the more remote or further removed barriers are from policy makers, the more difficult it is correct such barriers at their root or source. Conversely, the closer and more influence that policy makers have over identifiable barriers, the easier it is to correct such barriers.

2.8 Research Gaps in the Barriers to Adaptation Planning Literature on SIDS

The adaptation planning literature explores a number of approaches to adaptation which are deemed suitable for addressing climate risk and vulnerability in SIDS. These include scenario planning, sustainability planning, CBA, and EbA (Bennet et al., 2016b; Bishop & Payne, 2012; Khan & Amelie, 2015; Nunn et al., 2014). While these approaches are useful in providing strategic policy direction and informing various aspects of adaptation, their effectiveness is enhanced when they are translated into concrete development plans and projects. With the help

of financial and technical assistance from international donor agencies, there has been a concerted effort in SIDS to strengthen the policy response to climate change (Robinson & Doran, 2017; Medeiros et al., 2011). However, the SIDS literature does not explicitly examine the relationship between adaptation policy and planning in terms of the legal and institutional frameworks for translating policies into actionable plans and projects. In developing specific on-the-ground adaptation actions, consideration should be given to the planning frameworks in place for enabling such actions (Dovers & Hezri, 2010). Innes and Booher (2010) contend that public officials often try to address policy failures by attempting to fix the policies themselves, without paying sufficient attention to whether or not institutional structures and practices could be more effective in support of public policy.

Detail analysis of actual planning practice within SIDS is underexplored within the adaptation planning literature which focuses more on adaptation in relation to governance, as opposed to the specific nuances of formal planning. While it is widely acknowledged that adaptation decision-making is not limited to the realm of planning (see Bulkeley, 2013; Campbell, 2006; Davoudi et al., 2009; Wilson & Piper, 2010), planning continues to play an important role in adaptation. This makes it necessary to strengthen the relationship between adaptation and formal planning, as part of improving overall adaptation governance.

Formal planning defines the legal responsibilities and much of the power sharing among the network of actors involved in climate governance at the national and sub-national scales (van Burren et al., 2014). In so doing, planning frameworks help to condition the relationship between the state and other societal actors involved in adaptation decision making and are critical to the work of planners. Planning can be considered as a road map or blueprint for achieving policy objectives. It involves the systematic allocation of resources and the management of

opportunities and risks for the purpose of achieving explicit goals in the furtherance of broad policy objectives (Dovers & Hezri, 2010). Through formal planning, the state can encourage and support adaptive behaviour by shaping the decision-making environment through legislation and regulations, organizational arrangements applied to state agencies, and the behavioural norms that these actions cultivate within their sphere of influence (Tompkins, 2005).

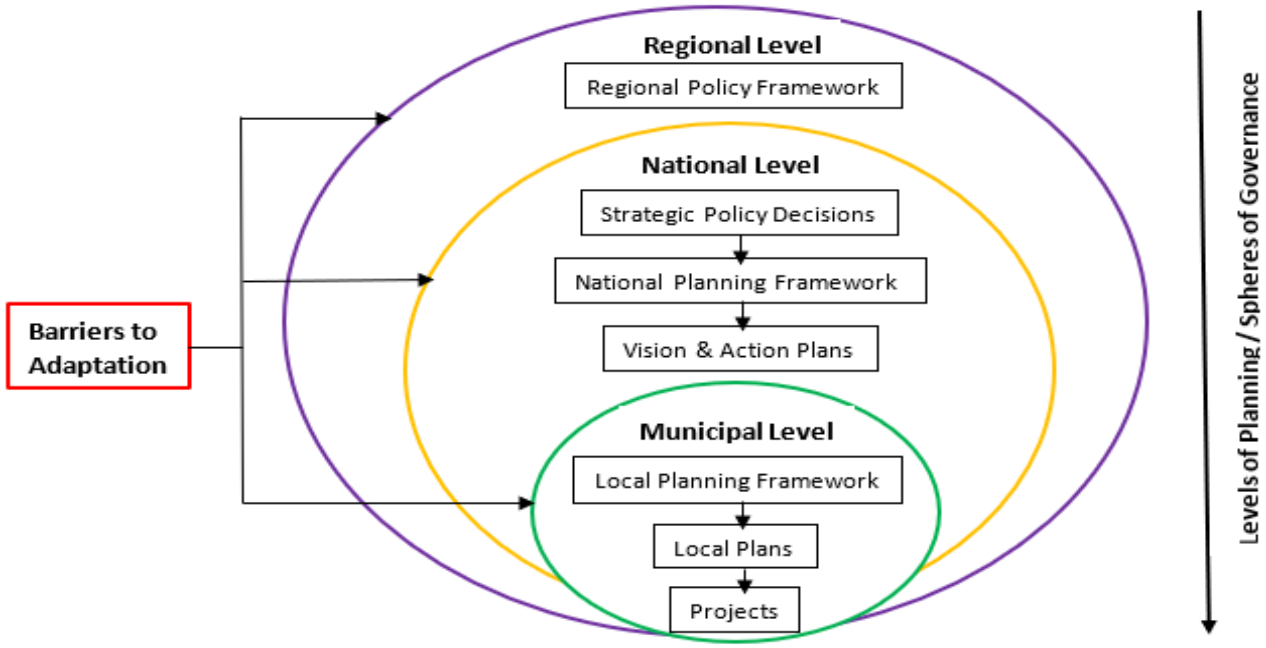
Although most of the literature on the barriers to adaptation emanate from developed countries, there is a gradual emerging body of literature which examines the barriers to adaptation in SIDS (see Betzold, 2015; Butcher-Gollach, 2015; Kuruppu & Willie, 2015; Lata & Nunn, 2012; Robinson, 2017). Two noticeable research gaps appear in the literature on the barriers to adaptation in SIDS. The first is that few studies look at the barriers to adaptation as manifested within the formal planning frameworks which exist in SIDS. Formal planning in SIDS is not only underdeveloped but also under-researched (see Butcher-Gollach, 2015). If formal planning is to serve as a meaningful vehicle for advancing adaptation in SIDS, then it should be structured and organized to help reduce the barriers to adaptation, particularly institutional barriers.

The second research gap is an extension of the first in that the SIDS literature fails to examine the barriers to adaptation as played out in the different stages of the planning process. While studies such as Clar et al., (2013); Moser & Ekstrom (2014); and Uittenbroek et al., (2013) use case studies from the developed world to examine the barriers to adaptation in relation to the various stages involved in the planning process, similar studies are non-existent in SIDS. Linking the barriers to adaptation with the stages involved in the planning process facilitates an applied systematic analysis of the barriers to adaptation (Moser & Ekstrom, 2010). In so doing, planners are better able to understand how barriers impede the adaptation process.

2.8.1 Addressing the Research Gaps Identified

This subsection outlines how the research gaps pertaining to adaptation planning and the barriers to adaptation identified above will be addressed by this research. Figure 2.2 presents a conceptual framework for examining planning and the barriers to adaptation. The framework was informed by grey literature from the Caribbean. The framework is applied to the Caribbean SIDS context using a three-pronged approach.

Figure 2.2 Conceptual Framework for Examining Planning and the Barriers to Adaptation in Caribbean SIDS



The current state of adaptation planning in Caribbean SIDS is examined by looking at the planning provisions which exist at the regional, national, and local levels to support adaptation. This involves an examination of the policy, legal, and institutional mechanisms which shape adaptation decision-making at different levels of planning. In so doing, the research captures the current state of adaptation in Caribbean SIDS from a planning perspective.

The second component of this research focuses on barriers to adaptation in Caribbean SIDS. These barriers are captured and enumerated by means of a survey. The third component of this research involves an assessment of how the barriers identified constrain adaptation at the different levels of planning in Caribbean SIDS. It also looks at how the barriers to adaptation affect different stages of the planning process.

This three-pronged approach allows for an exploration of the linkages between planning and the barriers to adaptation in Caribbean SIDS. While the research utilizes a planning lens to examine the barriers to adaptation in Caribbean SIDS, it acknowledges that not all the issues fit into a planning perspective. Issues of governance invariably arise. This is why the conceptual framework shown in Figure 2.2 recognizes the overlapping spheres of influence which exist in adaptation decision making, as opposed to rigid delineated levels of planning.

2.9 Conclusion

Planned adaptation to climate change is considered as an imperative for SIDS to achieve sustainable development and build communities which are resilient to the impacts of climate change. As with elsewhere, adaptation planning in SIDS is beset by challenges such as resource constraints, weak and poorly developed institutional and governance arrangements, conflict among stakeholders, balancing short-term planning and project cycles with long-term adaptation, insufficient knowledge and awareness of climate change, among other issues. The major differences are that these barriers are more severe in SIDS where local livelihoods are overwhelmingly dependent on climate-sensitive natural resources, and existing adaptive capacity very weak. Effectively addressing the barriers to adaptation is of critical importance for SIDS going forward. Existing research shows that barriers to adaptation in SIDS are not sufficiently

examined in relation to formal spatial planning, despite the widespread recognition of the importance of planning in advancing adaptation. Addressing this void in the scholarship is important to strengthening the role of planning in climate change adaptation.

Chapter Three
Case Study Context

3.1 Introduction

To help understand the research setting, this chapter provides a contextual overview of the study area (see Figure 3.1). This case study is comprised of countries which are members of the Caribbean Community (CARICOM). As shown in Table 3.1 below, CARICOM is a grouping of twenty countries – fifteen Member States and five Associate Members which are committed to deepening regional integration in the areas of economic development, foreign policy coordination, human and social development, and security. This grouping has a population of approximately 16 million people, with English being the major language complemented by French and Dutch.[1]

Table 3.1 CARICOM Member States and Associate Members

Member States	Associate Members
Antigua and Barbuda	Anguilla
Bahamas	Bermuda
Barbados	British Virgin Islands
Belize	Cayman Islands
Dominica	Turk & Caicos Islands
Grenada	
Guyana	
Haiti	
Jamaica	
Montserrat	
St. Lucia	
St. Kitts & Nevis	
St. Vincent & the Grenadines	
Suriname	
Trinidad & Tobago	

[1] https://caricom.org/about-caricom/who-we-are

With the exception of Belize in Central America, as well as Guyana and Suriname in South America, all CARICOM Members and Associate Member states are island states. All fifteen CARICOM Member States, as well as the five Associate Members, are part of the global grouping of Small Island Developing States (SIDS) as recognized by the United Nations. These states fall into the category of SIDS because of the development constraints, social, economic, and environmental vulnerabilities which they face, as strictly opposed to their per capita income and official geographic designation. This explains why there are a few anomalies within Caribbean SIDS, whereby, strictly speaking, some Caribbean SIDS are not island states, while there are a few which are deemed as high-income countries based on their per capita income.

Figure 3.1 Map of the Caribbean

Source: *www.geology.com*

As a region, the Caribbean has the highest number of SIDS in the world (Pulwarty, Nurse, & Trotz, 2010), but not all Caribbean SIDS, e.g. Cuba and the Dominican Republic are

officially part of the CARICOM grouping. However, CARICOM as a regional body represents the largest grouping of SIDS within the Caribbean. Against this background, the term Caribbean SIDS as used in this dissertation is confined to CARICOM states. Likewise, the use of the term region is in sole reference to the Caribbean.

Section 3.2 outlines the geographic characteristics of the Caribbean and the challenges this creates for climate change adaptation within the region. Section 3.3 presents an economic overview of the Caribbean. The geographical and economic characteristics of the Caribbean, coupled with the region's limited adaptive capacity makes the Caribbean highly vulnerable to the impacts of climate change. This is outlined in section 3.4. A synopsis of the threat of climate change to the sustainable development of the Caribbean region is provided in section 3.5. An overview of the planning framework for undertaking climate change adaptation and mitigation is presented in section 3.6. This is followed by brief concluding remarks in section 3.7.

3.2 Geographic Overview of Caribbean SIDS

The physical characteristics of the islands within the Caribbean inadvertently render them highly susceptible to both hydro-meteorological and geological hazards (Rhiney, 2015). Most of the land cover within the islands of the Caribbean is rugged and prone to land slippages, or very flat and susceptible to flooding to provide suitable options for settlement (De Graff et al., 2012). Historical patterns of urbanization, as well as recent tourism development, has resulted in a concentration of settlement, infrastructure, and economic activity in the coastal zone, i.e. the relatively narrow strip of flat or undulating land parallel to the sea (Potter, 2000; Wade & Webber 2002). Much of the population growth and urbanization taking place in the Caribbean is occurring within the coastal zone where an estimated seventy-five percent of the population

resides (Pulwarty et al, 2010; Wade & Webber, 2002). In the Eastern Caribbean, over fifty percent of the total population live within two kilometers from the coastline (Dulal et al, 2009). This concentration of population and economic activity in the coastal zone creates a coastal squeeze, in that there is immense pressure on coastal lands and resources to accommodate urban growth and development in ways that are sustainable. Within the coastal zone, there is a high demand for land, critical infrastructure, and urban services to create liveable communities. Due to limited resources, institutional and governance constraints, national governments within the Caribbean have been unable to effectively address the challenges associated with urbanization. This has resulted in haphazard urban growth, and high levels of informal and illegal settlements which are often located on marginal hazard-prone lands (Besson & Momsen, 2007; Dulal et al, 2009; Lopez-Marrero & Wisner, 2012). These informal and illegal settlements tend to be poor communities lacking critical infrastructure and urban services. They are unsustainable and compromise the integrity of the fragile terrestrial and marine ecosystems which exist within the Caribbean. Their continued growth and expansion degrade the environment – further exacerbating the region's vulnerability to climate change.

3.3 Economic Overview of Caribbean SIDS

Climate change is a threat to the economic well-being of Caribbean SIDS due to their strong dependence climate-sensitive economic activities, such as marine tourism, agriculture, fisheries, and forestry, to support local livelihoods (Pulwarty et al, 2010). The economic, and to a lesser extent social well-being of the Caribbean is dependent on maintaining its environmental resources and the ecosystem services which they provide. Environmental degradation arising from both unplanned and planned development destroys climate-sensitive ecosystems such as mangroves, coral reefs, beaches, and watersheds. Having healthy ecosystems is, therefore,

essential to sustaining the vital economic sectors on which Caribbean SIDS depend. High economic dependency on natural resources within the Caribbean, exacerbates the vulnerability of the region to natural disasters (IMF, 2013). Caribbean SIDS have poorly developed and diversified economies. They rely heavily on imports and are highly dependent on the outside world for their economic survival. Consequently, they do not enjoy the benefits that are derived from having local economies of scale. They are also extremely vulnerable to sudden and unpredictable changes in the global political economy, as well as external environmental catastrophes such as widespread drought or a large oil spill (Bishop & Payne 2012) which can drive up commodity prices.

Many Caribbean SIDS are straddled with huge debt burdens and are undergoing significant structural economic readjustments (Bishop & Payne, 2012; ECLAC, 2011). This creates a cash squeeze which means that there is even less money available to fund local adaptation initiatives. This has led to a strong reliance on external multilateral organizations such as the World Bank, Inter-American Development Bank, and the United Nations for financial and technical support to develop adaptation policies and programmes (ECLAC, 2011; Medeiros et al., 2011; Sherman et al., 2016). An unintended consequence of this dependence is that adaptation policies may be implicitly framed to meet external funding requirements, rather than local needs (Bishop & Payne, 2012; Medeiros et al., 2011; Tompkins & Adger, 2002).

3.4 Climate Change Impacts and Vulnerability Within Caribbean SIDS

The effects of climate change on SIDS are widely documented in both the development and environmental planning literature (see Barnett & Campbell, 2010; Bishop & Payne, 2012; Kelman & West, 2009; Lane et al., 2013; Lopez-Marrero & Wisner, 2012; McGregor et al., 2009; Mirza, 2003; Nunn, et al., 2014; Pelling & Uitto, 2001; Pulwarty et al., 2010; United

Nations, 1994; UNEP, 2008; Voccia, 2012). Among the threats facing Caribbean SIDS as a result of climate change are sea level rise, more intense and frequent storms, droughts, and floods (Pulwarty et al., 2010). Table 3.2 further highlights the various threats facing Caribbean SIDS due to climate change.

Table 3.2 Impacts of Climate Change on Caribbean SIDS

Change Factor	Impact
Sea Level Rise	▪ Sea level rose at an average rate of 1.8 MM/ yr between 1961 and 2003, but the yearly rate of increase has been rising. The rise in sea level between 1993 – 2003 averaged 3.1 MM/ yr. ▪ Inundation of low-lying coastal communities ▪ Saline intrusion into groundwater
Storms & Hurricanes	▪ Increase in the intensity and frequency of hurricanes resulting in increased damage to housing, agriculture, commercial buildings, ports and infrastructure from flooding, wind, and landslides. ▪ Beach erosion and damage to hotels and tourism-related infrastructure
Rainfall Patterns	▪ Change in rainfall regimes ▪ Increase in both drought and heavy precipitation events resulting in more extreme drought and flood occurrences
Temperature	▪ The World Meteorological Organization (WMO) has ranked 2014 as the hottest year on record ▪ Stronger hurricanes forming at lower latitudes ▪ More rapid transition of hurricanes into category 4 and 5 ▪ Increase incidences of coral bleaching, droughts, flood events, pest infestation, beach erosion, as well as, water and vector bore diseases.

Source: Compiled by Author with data from Trotz (2008) and WMO (2015)

Among the various impacts of climate change, sea level rise is regarded as the most significant threat facing Caribbean SIDS (Lewsey et al., 2004). This is corroborated by extensive sea level rise modeling in fifteen Caribbean countries conducted by Caribsave (Simpson et al., 2010), which suggests that a one-meter rise in sea level would displace over 110,000 people and destroy one percent of agricultural lands. At least 149 multi-million-dollar tourist resorts, along with beach assets would be severely damaged or lost. Twenty-eight percent of the Caribbean's

airports and eighty percent of the sea ports would suffer severe damage from inundation. The total damage was estimated at a cost between US $4 billion to $6 billion annually, amounting to a whopping $87 billion by 2080. Recent climate change projections indicate that temperatures within the Caribbean may increase by as much as 4 degrees Celsius by 2100 (Campbell et al., 2011). This projected change in temperature is expected to result in increased rainfall in the northern Caribbean, but a 25 percent – 50 percent reduction in rainfall in the southern Caribbean. Both reduced rainfall and sea level rise directly threaten the availability of freshwater in the Caribbean to support on-going population increase and urban growth (Dulal et al., 2009; Mercer et al., 2012).

Box 1: Vulnerability of Caribbean SIDS

Geography – Small size, rugged and prone to land slippages, flood prone, concentration of settlements and productive assets along the coast, small interiors and large coastal zones, intense demand for land and competing land uses, exposed to multiple interacting hydro-meteorological and geological hazards.

Economic – Small economies and internal markets, high dependence on climate sensitive natural resources to sustain livelihoods, economy dominated by a single sector, dependence on external financing, high debt burden, highly vulnerable to global economic shocks and changing commodity prices, dis-economies of scale leading to high per capita cost for infrastructure and services.

Demographic – Rapid urbanization, urban primacy, small population, limited skill human resource base.

Insularity & Remoteness – High external transport cost, time delays and high cost in accessing external goods.

Adaptive Capacity – Limited insurance coverage, weak enforcement of planning regulations, reliant on external financing for local adaptation, ineffective institutional and legislative frameworks to support adaptation, weak local governance.

Source: Bishop & Payne, 2012, Dulal et al., 2009; ECLAC, 2010; Pelling & Uitto, 2001; Pulwarty et al., 2010

If not properly managed, the inherent vulnerability of Caribbean SIDS (Box 1) to sea level rise, storms, droughts, floods, and other climate change impacts can seriously jeopardize progress towards sustainable development in the region (Bishop & Payne, 2012; ECLAC, 2010; Mercer et al., 2012). Limiting average global temperature increase to 1.5 degrees Celsius is deemed as a critical tipping point, beyond which SIDS could face irreversible damage from sea level rise and other climate change impacts (UN-OHRLLS, 2015). The escalating cost of damage arising from climatic events places further strain on the beleaguered economies of Caribbean SIDS. The cost of damage arising from tropical storms and hurricanes in the Caribbean between 1990 – 2014 was $US 34.7 billion, compared to $US 17 billion over the period 1960 – 1989 (Acevedo, 2016). The impact of the damage is heightened by the fact that a single event can wipe out the entire annual Gross Domestic Product (GDP) of an island, as was the case with hurricane Ivan in 2004 which created damage in Grenada to the tune of $US 889 million or 212% of GDP (ECLAC, 2005). The critical challenge within Caribbean SIDS is not ignorance of the impacts of climate change per se, but rather how best to address climate change adaptation and mitigation at all levels of society, particularly at the local or community level.

3.5 Sustainable Development and Climate Change Adaptation in Caribbean SIDS

Building resilience to climate change is an integral component of the development agenda of Caribbean SIDS. As a complex cross-cutting issue, climate change poses a severe threat to current as well as future development within Caribbean SIDS (Bishop & Payne, 2012). The urgent need for sustainable development in SIDS and the wider developing world has led the United Nations to adopt the 2030 Sustainable Development Goals (SDGs) following the Rio +20 summit in 2012. Like its predecessor - the Millennium Development Goals (MDGs), the SDGs represent the global consensus on quantifiable targets for addressing a range of issues related to

sustainable development (UNDP, 2005; Sachs, 2012). These issues include eradicating poverty, food insecurity, sustainable resource management, promoting partnerships for sustainable development, etc. – issues which are to varying degrees linked to climate change.

The SDGs embrace the triple bottom-up approach which emphasizes a balanced combination of economic development, environmental sustainability, and social inclusion or equity (Sachs, 2012). Goal number thirteen requires that countries take urgent actions to combat climate change and its impact. Associated with goal number thirteen are five specific targets. The fifth target speaks to planning and climate change in Small Island Developing States (SIDS) and least developed countries, and in part reads: "Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing states, including focusing on women, youth, local and marginalized communities" (UNDP, n.d.). Through the development planning process, Caribbean SIDS are increasingly co-opting the SDGs into their respective planning and policy frameworks via long-term national vision plans, spatial development plans, and local municipal plans. Existing synergies between climate change and sustainable development mean that mainstreaming adaptation can provide trade-offs for achieving both development and adaptation goals in Caribbean SIDS.

3.6 Architecture for Adaptation Planning in Caribbean SIDS

The architecture for climate change adaptation and mitigation in Caribbean SIDS is inclusive of policies and actors at the regional, national, and local levels. Actors operating at the regional, national, and local levels have overlapping spheres of influence and are linked via transnational networks with the broader global governance architecture for climate change.

3.6.1 Regional Level Adaptation Planning

At a regional level, the Caribbean Community for Climate Change Centre (CCCCC) otherwise known as the 5Cs coordinates CARICOM's response to climate change. The CCCCC is the official repository and clearing house for regional climate change information and provides climate change-related policy advice and guidelines to CARICOM member states. It is recognized by the United Nations Framework Convention on Climate Change (UNFCCC) as the focal point for climate change issues within the Caribbean. The centre also serves as an oversight agency for various internationally funded climate change projects which are executed in partnership with national governments across the Caribbean. The link between the CCCCC and each CARICOM member state is the national focal point which works within the department of government that deals directly with climate change at the national level.

The principal policy instrument used by the CCCCC to guide CARICOM's response to climate change is the 2009 – 2021 Regional Framework for Achieving Development Resilient to Climate Change, which is accompanied by an implementation plan for the period 2011 – 2021 (CCCCC, 2012). The framework seeks to increase the resilience of CARICOM economies to climate change by:

1. Mainstreaming climate change adaptation into the sustainable development agendas of CARICOM states.
2. Reducing greenhouse gas emissions through the use of renewable energy technologies and fossil fuel reduction.

3. Reducing the vulnerability of natural and human systems to the impacts of climate change, with a special focus on the water sector, coastal and marine ecosystems, tourism, coastal infrastructure, and health.
4. Promoting the prudent management of forest and wetlands resources for social, economic, and environmental benefits.

In addition, the framework also serves a mechanism for CARICOM to engage the international community in terms of strengthening the adaptive capacity of CARICOM countries to adapt to climate change (CCCCC, 2009). The framework is implemented through a series of projects which support the above objectives. There is also a monitoring and evaluation component whereby both the Regional Framework and Implementation Plan are supposed to be reviewed once every two years to ensure that they remain current (CCCCC, 2012).

In addition to the CCCCC, other regional entities such as the Caribbean Meteorological Organization (CMO) and the Caribbean Disaster and Emergency Management Agency (CDEMA) lend support to adaptation planning in the Caribbean through the provision of various climate change services and technical guidance. With regards to the latter entity, one can argue from a theoretical perspective that the disaster risk management activities of CDEMA differ from climate change adaptation which focuses on long-term disaster risk reduction, building adaptive capacity, and resilience – though the two are not mutually exclusive in practice.

3.6.2 National Level Adaptation Planning

At the country level, National Communications, as well as National Adaptation Programmes of Action (NAPAs) have been prepared under the aegis of the United Nations Framework Convention on Climate Change (UNFCCC). NAPAs are exclusive to Least

Developed Countries (per capita income under USD 750) and are specifically intended to help them identify immediate adaptation needs and priority actions – those which further delay will increase vulnerability, future damage, and adaptation cost (www.unfccc.int). Among Caribbean SIDS, only Haiti falls into the category of Least Developed Countries (LDCs). The other Caribbean SIDS range from low middle-income to high middle-income countries. Caribbean SIDS which are signatories to the UNFCCC are required to prepare scheduled National Communications (i.e. reports) outlining their greenhouse gas inventories, mitigation, and adaptation priorities. Following the UNFCCC Conference of the Parties (COP21) in Paris in December 2015, countries which are signatories to the Convention have committed to outlining the measures that they will be taking post 2020 to reduce emissions. This is being done as part of a collective effort to limit average global temperature increase to 1.5 ^{0}C above pre-industrial levels. Limiting the increase in mean global temperature to 1.5 ^{0}C above pre-industrial levels is considered as a critical threshold to ensure the survival of SIDS (UN-ORLLS, 2015). These measures are referred to as Nationally Determined Contributions (NDCs), which countries are expected to update every five years (UNFCCC, 2014). NDCs are mechanisms for national governments to communicate to the wider global community the steps that they will take to address climate change in their own countries (UNFCCC, 2014). In this regard, NDCs create a feedback loop between national and international decision making on climate change. Strictly speaking, reports submitted by Caribbean SIDS to the UNFCCC do not constitute a policy mechanism per se, but function as baseline studies which are used to inform subsequent policy development and implementation. UNFCCC national communications prepared by Caribbean SIDS have been criticized as obligatory reports having a mitigation bias, and which are done

primarily to receive UNFCCC funding, rather than serving as a concrete policy framework to guide urgently needed adaptation (Bishop & Payne, 2012).

Table 3.3 gives an overview of various national level climate change policy instruments that exist within CARICOM member states. These policy instruments are highlighted because they speak exclusively to the issue of climate change.

Table 3.3 National Climate Change Policy Instruments in CARICOM Member States

Country	UNFCCC 1st National Report	UNFCCC 2nd National Report	UNFCCC 3rd National Report	Climate Change Policy OR Adaptation Plan	Climate change Legislation	Lead Agencies
Antigua & Barbuda	Sep 2001	Nov 2011	Sep 2016	Adaptation strategy & Action Plan: Water Sector (2014)		Environment Division
Bahamas	Nov 2001			Multi-sector Adaptation Plan (2005)		Ministry of Environment
Barbados	Oct 2001			National Climate Change Policy (2012)		Ministry of Environment & Drainage
Belize	Sep 2002	Oct 2011	Apr 2016	Agriculture sector Adaptation Strategy (2015)		National Climate Change Office
Dominica	Dec 2001	Nov 2012		Low Carbon Climate-Resilient Dev Strategy (2012)		Ministry of Environment
Grenada	Nov 2000			In progress		Ministry of Environment
Guyana	May 2002	Sep 2012		Draft Climate Resilience Strategy & Action Plan (2015)		Office of Climate Change
Haiti	Jan 2002	Oct 2013		UNFCC NAPA (2006)		Ministry of Environment
Jamaica	Nov 2002	Dec 2011		Climate change policy Framework & Action Plan (2015)		Climate change Division

Country	UNFCCC 1st National Report	UNFCCC 2nd National Report	UNFCCC 3rd National Report	Climate Change Policy OR Adaptation Plan	Climate change Legislation	Lead Agencies
Montserrat				Under consideration		Ministry of Agri, Land, Housing, & Environment
St. Kitts & Nevis	Nov 2001	Mar 2016		In progress		Ministry of Environment
St. Lucia	Nov 2001	Apr 2012		Climate Change Adaptation Policy (2015)		Ministry of Environment
St. Vincent & the Grenadines	Nov 2000	Apr 2016		Under consideration		Ministry of Planning & Sustainable Development
Trinidad & Tobago	Nov 2001	Nov 2013		National Climate Change Policy (2011)		Ministry of Planning & Development
*Anguilla				Draft Low Carbon Climate-Resilient Development Policy (2011)		Dept of Environment
*Bermuda						Dept of Environment
*Cayman Islands				Draft Low Carbon Climate-Resilient Development Policy (2011)		Dept of Environment
*British Virgin Islands				Low Carbon Climate-Resilient Development Policy (2011)	Climate change Trust Fund Act (2015)	Ministry of Natural Resources & Labour
*Turks & Caicos Islands				Draft Climate Change Policy (2011)		Dept of Env and Maritime Affairs

*Associate members of CARICOM
Source: Compiled using data from the UNFCCC & multiple government websites

Recognition of the need for a comprehensive policy framework to address climate change in Caribbean SIDS is leading to the gradual creation of broad-based national climate change strategies, albeit that some policies are sector driven instead of being cross-cutting. Several Caribbean SIDS such as Jamaica, Trinidad and Tobago, Barbados, Dominica, St. Lucia, Bahamas, among others, have developed a national climate change policy to coordinate and

guide the mainstreaming of adaptation and mitigation into national and local sustainable development planning. The national focal point or lead agency for climate change varies across Caribbean SIDS, but the overall trend is that the department or ministry of the environment within the respective islands has oversight responsibility for climate change. Notable exceptions are Jamaica, Belize, and Guyana which respectively have a climate change unit that exclusively focuses on climate change issues. Although a particular division or ministry of government may function as the lead agency for climate change, implementation involves various ministries and government agencies and is undertaken at different levels of planning. This fragmentation can be argued as inevitable, given the far-reaching and diverse impacts of climate change across virtually all sectors of society and levels of planning (Adger et al., 2005; Biermann et al., 2009; Nalau et al., 2015).

Explicit statutory support for climate change planning is non-existent within the Caribbean, barring in the British Virgin Islands (BVI) an associate CARICOM member state, where a Climate Change Trust Fund Act was created in 2015. Even then, the Act does not directly focus on climate change planning but rather seeks to streamline funding for local climate projects and initiatives within the BVI. Presently, legislative support for climate change is subsumed within various planning and environmental laws which have implications for climate change.

Planning legislation within the Caribbean overwhelmingly concentrates power in the hands of the minister responsible for planning who has wide-ranging discretionary powers (Pugh, 2006). The minister of planning is usually responsible for preparing a statutory national spatial plan to guide country-wide development and inform community planning (McHardy 2002, Toppin-Allahar, 2001). This responsibility is usually delegated to the central planning

agency which also undertakes various aspects of community planning in the absence of a strong local government system. In Jamaica, this requirement slightly differs. That country's planning legislation requires that the minister in charge of planning prepares a statutory development order (i.e. policy) for different sections of the island or the entire island (McHardy, 2002).

National spatial plans are intended to function as part of an overarching national development planning framework which also include long-term strategic vision plans, typically ranging from 15 – 25 years. Vision plans are intended to address the full gamut of issues related to sustainable national development, including climate change, and the management of environmental and land resources. Examples of current national vision plans from across the Caribbean are Trinidad and Tobago National Development Strategy 2016 – 2030; St. Vincent and the Grenadines National Economic and Social Development Plan 2013 – 2025; Vision 2030 Jamaica National Development Plan, and Vision 2040 – The National Development Plan of the Bahamas. Attempts have been made to align these recent national vision plans with the Sustainable Development Goals (SDGs) outlined in the United Nations 2030 Agenda for Sustainable Development.

National vision plans, as well as complementary national spatial plans, are not always kept current or updated due to changes in political administrations, as well as time and resource constraints. In practice, more emphasis is placed on medium-term socio-economic policy frameworks spanning 3 – 5 years. This policy instrument outlines the immediate development goals and priorities, as well as guide major government projects and private sector investments. Consequently, medium-term socio-economic policy frameworks are usually aligned to fit national election cycles. Ideally, these policy frameworks are supposed to facilitate the phased implementation of national vision plans. However, medium-term socio-economic policies are

pragmatically used as both a political and managerial instrument. Medium-term socio-economic frameworks allow the ruling party to enact its own plans and objectives for national development while in office. They are invariably used to influence the development process in ways which further the interest of the ruling political party. Medium-term socio-economic policy frameworks also guide the operations of various national-level planning agencies. Essentially the various planning agencies execute their respective mandates to support the objectives of the current medium-term socio-economic policy framework.

3.6.3 Local Level Adaptation Planning

Local government, also referred to as municipal government, is very weak and in some cases non-existent within Caribbean SIDS, owing to small geographic and population size, limited technical, financial, and human resources. In cases where local governments exist, they are devoid of substantive planning power (McHardy, 2002; Schoburgh, 2007; Wyatt, 2011). Consequently, planning in the Caribbean has tended to be top-down in the conception, design, and implementation of public policy. Of the fifteen CARICOM member states, eleven countries have various elements of local government, as opposed to a fully developed and autonomous system of local government. Among these eleven countries, local government is constitutionally enshrined in only four countries: Guyana, Suriname, Haiti (Schoburgh, 2012) and more recently Jamaica. The remaining CARICOM countries have no formal system of local government in place. In those CARICOM countries with a formal system of local government, their role is largely relegated to assisting central government in the provision of urban services and the exercise of development control functions, with minimal involvement in local development planning (Schoburgh, 2012). Owing to the lack of local planning capacity, core municipal planning functions are primarily undertaken by central government agencies. The small size of

most Caribbean territories necessitates that policy makers often simultaneously undertake planning activities at both the national and community levels. This creates a situation where the demarcation between national and local planning within the Caribbean is somewhat blurred. Community development plans are often integrated as chapters within the overarching national spatial plan in the smaller Caribbean islands which do not have formal municipal management structures. This is the case in the draft 2017 Physical Development Plan for Barbados, and the 2016 National Physical Development Plan for Dominica.

Because there is not a well-developed system of municipal government accompanied by a distinct suite of local planning policies, local climate change adaptation planning within Caribbean SIDS is more akin to undertaking various community-level adaptation related projects, rather than having a formal institutionalized process for local policy making and implementation. Such projects are an essential part of the rollout or implementation of various national-level and sector-based adaptation policies. The institutional capacity for policy development and implementation resides within central government. This helps to explain the project-centered approach to local climate change adaptation planning in Caribbean SIDS, where projects rather than policies are designed to meet the adaptation needs of local communities. This context should be borne in mind when assessing local adaptation planning in Caribbean SIDS.

3.7 Conclusion

Caribbean SIDS are among those who stand to suffer the most from climate change, although their contribution to global greenhouse gas emissions are negligible – less than one percent of total global output (World Resources Institute, 2008). Climate change threatens the sustainable development of Caribbean SIDS which are struggling to manage and adapt to new risks while having to deal with the traditional development constraints which characterize the

region. The Caribbean region with its large and diverse composition of SIDS provides an excellent case study for examining the interplay between planning and the barriers to adaptation. Institutional and policy mechanisms exist at the regional and national levels to address climate change but are largely absent at the local level. An examination of the extent to which the planning response addresses the barriers to adaptation in Caribbean SIDS can provide meaningful insights not only for the Caribbean but the wider SIDS community.

Chapter Four
Methodology and Methods

4.1 Introduction

The following chapter describes the methodology that this research employed to explore how to improve the planning response to the barriers associated with climate change adaptation in Caribbean SIDS. The chapter begins by outlining the philosophical paradigm adopted by this research. It details the process by which a mixed method research design was utilized to address the research objectives. The linkages between the research objectives and the data collection methods are outlined. The chapter finishes by examining the limitations of the research design and the measures that were taken to mitigate these limitations.

4.2 Ontological and Epistemological Framework

Ontology can be considered as the nature of reality or the science and study of being (Blaikie, 2010). The term epistemology denotes how our knowledge of what is considered reality is captured through different types of inquiry or methods of investigation (Hirschhiem, Klein, & Lyytinen, 1995). Epistemology can, therefore, be thought of as the relationship between the researcher and reality (Guba & Lincoln, 1994), i.e. how researchers go about finding out what they believe can be known or measured. The underlying assumption is that one's view of reality and the theory of knowledge form the basis for how research is conducted.

The nature of reality or what is deemed to be truth is a highly contested issue reflecting various ontologies and associated epistemological viewpoints or research paradigms (Creswell, 2014; Palys & Atchinson, 2014; Powell, 2001). This research rejects the positivist notion that truth is solely an independent objective reality to be discovered through scientific inquiry

(Bhaskar, 2013; Cruickshank, 2011). Likewise, it also rejects the constructivist or interpretivist position of truth as being a wholly subjective construction of human ideas (Cruickshank, 2011). By themselves, each of these opposing paradigms is unable to provide a comprehensive understanding of the complexities involved in climate change adaptation within social-ecological systems. At its core, adaptation planning is a localized context-specific activity. Against this background, this research adopts an ontological position which considers truth or reality as ideas that are practically useful within a given problem context. This ontological position is wedded to an epistemological point of view which considers pragmatism as a legitimate basis for undertaking scientific inquiry. From a pragmatic philosophical perspective, "the mandate of science is not to find truth or reality, the existence of which is perpetually in dispute, but to facilitate human problem-solving" (Powell, 2001; p. 884).

4.3 Mixed Methods Approach

Rather than being confined to a single research paradigm, a pragmatic approach to scientific research encourages the use of a plurality of approaches to derive the best possible knowledge about the problem being investigated (Creswell, 2014). A pragmatic epistemology supports the use of a variety of research methods. The rationale for combining different methods is to find the best answers to the research problem under investigation by drawing on different types of data. A mixed method approach involves blending quantitative and qualitative methods of inquiry and analysis within one or more stages of the research process or across all the stages (Creswell, 2014; Leech & Onwuegbuzie, 2009). It draws on the strengths of quantitative and qualitative research traditions, thereby minimizing the biases and weaknesses associated with solely relying on either approach (Creswell, 2014; Palys & Atchinson, 2014). Triangulating

quantitative and qualitative data to identify areas of convergence and dissonance not only enhances analytical rigour but also strengthens research validity (Creswell, 2014).

The precise ways in which quantitative and qualitative data are mixed is dependent on the research design and the types of analyses to be undertaken. Mixed methods research can employ various designs depending on how the data is collected, analyzed, and interpreted. However, it is important to note that rigidly delineated designs do not always occur in practice which often reflects elements from different designs. Common designs for mixed methods research as identified by Creswell (2014); Gerring, (2017); Palys & Atchinson (2014) include:

I. Concurrent design – Quantitative and qualitative data collection and analysis occur at the same time, the results of which can be compared side by side or merged into a single database.

II. Explanatory sequential design - Quantitative data is collected and analyzed followed by qualitative data, the latter used to expound on the former.

III. Exploratory sequential design – Qualitative data is collected and analyzed followed by quantitative data. This is useful for undertaking inductive analyzes, as opposed to comparing both data sets.

IV. Embedded Design – One or more form of data is nested within a larger design.

V. Integrated Design – An eclectic blend involving elements of the above approaches to fit the real-life challenges involved in identifying, collecting, and analyzing the relevant data needed to address a research question or objective.

4.4 Research Design

4.4.1 Mixed Method Case Study

An explanatory sequential mixed method case study was used to undertake this research, whereby quantitative data was first collected and analyzed followed by qualitative data. The results of the quantitative analysis were further explored using the qualitative data gathered. Although the term case study features widely in different research domains, there is no precise universal definition of the term. Various definitional nuances exist depending on the type of research being undertaken. However, the term case study is generally associated with an in-depth analysis of a particular phenomenon as observed within a given real-world context (Gerring, 2017; Hammond & Wellington, 2013; Yin, 2018). The goal of a case study is to describe, explore, or explain the phenomenon under investigation in order to shed light on the larger population from which the case(s) are drawn (Gerring, 2017). A case study is therefore situated within a larger context, which allows for generalization of the research findings.

Most social research is undertaken using case studies (Hammond & Wellington, 2013). A case study is a suitable research strategy when the research addresses a contemporary phenomenon over which the researcher has no control (Yin, 2018). There are three primary advantages to the use of case studies in research. First, case studies provide rich contextual and analytical details which can be very useful in both formulating and testing theories and hypotheses related to the problem being investigated (Woodside, 2010; Yin 2018). Second, case studies can generate, as well as utilize both quantitative and qualitative data (Creswell, 2014). Third, triangulation techniques can be used to validate the research findings, which make them more generalizable (Creswell, 2014).

Based on the scope of one's research, a case study can be limited to a single case drawn from one site or multiples cases drawn from different sites which are then compared to each other. This research involves a single case study. However, as outlined in chapter three, this single case study is based on a grouping of twenty Caribbean SIDS which collectively constitute a single geopolitical entity known as the Caribbean Community (CARICOM).

A single case study should meet one or more of the following five criteria articulated by Yin (2018).

- Critical case – A critical test for a significant theory.
- Extreme or unique case – Documenting the precise nature of a phenomenon that is currently not well understood.
- Representative of a typical case – Capturing the conditions of a commonplace situation
- Revelatory case – A previously non-accessible phenomenon.
- Longitudinal case – Establishing change over time, causal mechanisms, patterns of transition, etc.

This case study is representative of a typical case. CARICOM has the largest grouping of SIDS globally. Hence to a large measure, CARICOM provides a typical representation of the broader global SIDS community.

Single case study research has been criticized for not being sufficiently representative of a problem context to allow for generalizations to be made (Woodside, 2010; Yin, 2018). In addition, single case studies are also vulnerable to confirmation bias in which the collection and analysis of data are biased so as to confirm the researcher's preconceived opinion (Creswell,

2014). However, the scope of this research helps to negate this criticism. In other words, using CARICOM as a single case study, as opposed to focusing on only one Caribbean territory, makes the research findings generalizable to the wider Caribbean SIDS context.

4.4.2 Constructing Validity and Reliability

Research is deemed to be valid if the ways in which data is collected and analyzed are appropriate for addressing the research questions and objectives. Reliability pertains to the issue of consistency. A research is reliable if another researcher collecting the same data, in the same manner, would essentially produce the same results (Creswell, 2014; Hammond & Wellington, 2013; Tight, 2017). Validity can be broken down into two categories: internal and external validity. Internal validity refers to drawing correct conclusions about the sample. Validity relies on triangulation and other procedures to ensure the accuracy of a research. Determining the internal validity of the empirical findings derived from mixed method case studies is a function of the way in which the data is integrated and interpreted (Creswell et al., 2014; Onwuegbuzie & Johnson, 2006). External validity refers to the degree to which the results drawn from the sample can be accurately generalized to the population at large (Vogt et al., 2012). This necessitates that the sample is representative of the general population. The following succinctly outlines how validity and reliability were constructed in this research.

A. Internal Validity – Methodological and data triangulation was undertaken to determine patterns of consistency or inconsistency in the data received. Methodological triangulation involved comparing the result of data gathered from using two or more different data collection methods. Data triangulation involved comparing data from two or more different data sources.

B. External Validity – Analysis and conclusions drawn from this study were measured against well-established theories and best practices in the literature to help determine the generalizability of the findings.

C. Reliability – A clearly developed research procedure and protocol were used to ensure that the data collection process can be repeated with the same results.

4.5 Organization of Data Collection

Data collection was roughly organized into three phases as shown in Table 4.1, with each phase addressing a specific research objective.

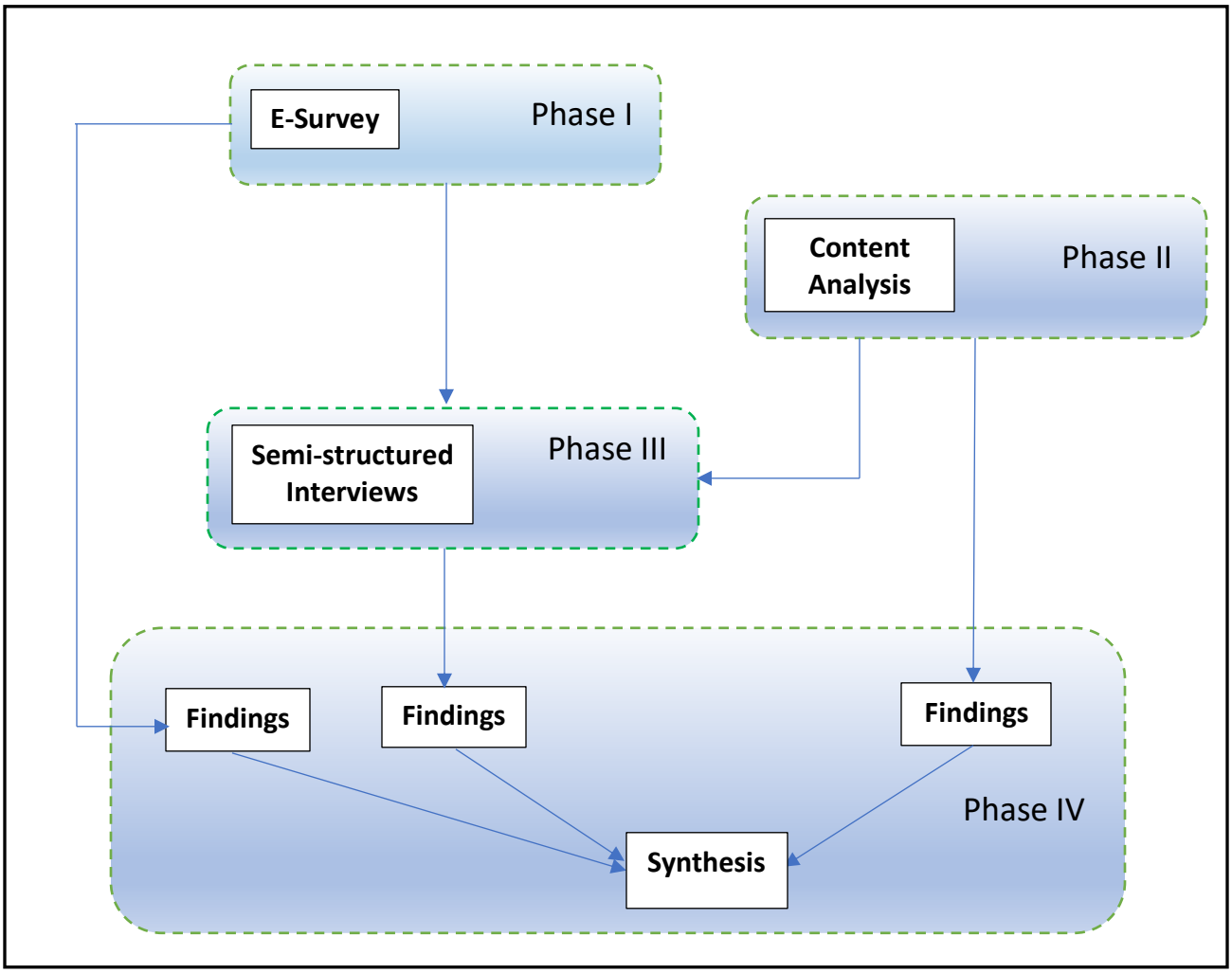
Table 4.1 Summary of Data Collection Methods

Research Objectives	Phase	Data Collection	Methods
1. Evaluate the current state of adaptation planning in Caribbean SIDS.	I, II & III	Quantitative & Qualitative	E-survey among national climate change focal points & planners from the respective planning departments in CARICOM member states Content analysis of selected regional & national policy documents related to climate change adaptation Semi-structured interviews with senior national policy makers in select CARICOM member states
2. Identify and assess the barriers to adaptation planning in Caribbean SIDS.	I	Quantitative	E-Survey among national climate change focal points & planners from the respective planning departments in CARICOM member states
3. Explore the linkages between the barriers to adaptation and the policy and planning frameworks which are used to advance adaptation in Caribbean SIDS.	III	Qualitative	Semi-structured interviews with senior national policy makers in select CARICOM member states

The data was collected in a largely sequential or phased manner, beginning with quantitative data in the form of an e-survey, followed by qualitative data generated from content analysis of key policy documents, and semi-structured interviews. To minimize the overall time for data collection, the content analysis was simultaneously undertaken alongside the e-survey. The results from the e-survey and the content analysis were then used to inform the semi-structured interviews. The findings related to the first research objective are presented in chapter five, while chapter six outlines the findings related to the second research objective. Chapter seven draws on the findings in chapters five and six to addresses the third research objective. Chapter eight pulls together all three objectives in concluding the research.

The quantitative and qualitative data generated from this research answered two different, but related sets of questions. The quantitative data addressed the 'what questions' or the descriptive dimensions of this research. Conversely, the qualitative data addressed the explanatory and exploratory dimensions of this research, i.e. the 'why' and 'how' questions which are important for developing in-depth contextual analysis (Silverman, 2013; Yin, 2011).

Figure 4.1 Methods Overview



4.6 Analytical Strategies

4.6.1 Deductive and Inductive Analyzes

This research employed a blend of deductive and inductive analyzes to examine the state of adaptation planning, and the barriers to adaptation in Caribbean SIDS. Deductive analyzes included applying the tenets of Moser & Ekstrom's (2010) framework for diagnosing the barriers to adaptation to the Caribbean SIDS context. This was done to determine the suitability of their framework in helping to understand and address the barriers to adaptation in Caribbean SIDS.

Through inductive analyzes, key thematic issues and barriers related to adaptation planning were identified from the e-survey and further explored in the semi-structured interviews. The insights gained from both the inductive and deductive analyzes were used to develop a set of guiding principles for addressing the barriers to climate change adaptation in Caribbean SIDS.

4.6.2 Triangulation

Triangulation in its strictest form is the use of three or more different methods to assess a phenomenon, with a greater convergence of results indicating stronger validity. Researchers using a triangulated approach "attack a research problem with an arsenal of methods that have non-overlapping weaknesses in addition to their complementary strengths" (Brewer & Hunter, 2006. p. 4). When two established instruments yield conflicting results, then the validity of each instrument is cast into doubt. Likewise, when the findings of different methods agree, the findings are deemed more reliable (Brewer & Hunter, 2006; Palys & Atchinson, 2014; Willis, Jost, & Nilakanta, 2007; Yin, 2011). Triangulation is considered a key strength of mixed methods research (Palys & Atchinson, 2011; Vandersteop & Johnston, 2009). Triangulation in mixed methods research is tied to the integration or mixing of quantitative and qualitative methods and data (Ivankova, Creswell, & Stick, 2006). This can take place at various points along the research continuum from the beginning of the research to the back end or discussion stage when quantitative and qualitative findings are merged together (Teddlie & Tashakkori, 2006; Onwuegbuzie & Johnson, 2006).

4.7 Data Collection Instruments

4.7.1 Survey

A survey is the use of a series of questions or observations to provide quantitative or numeric data about trends, attitudes, and perceptions within a given population (Creswell, 2014). The goal of a survey is to draw conclusions about a given population, based on a sample taken from the population. Surveys are useful for collecting a large amount of data from many people in a relatively short period of time (Vanderstoep & Johnston, 2009). The most utilized survey format is a questionnaire with a series of close-ended questions, though open-ended questions can be interspersed in the mix as well.

A questionnaire consisting of a total of forty-four items was administered to the national focal point[2] for climate change and planners from the planning department in all twenty CARICOM member states, inclusive of the five associate members. The questionnaire consisted of mainly close-ended responses. The questionnaire was administered electronically because the target population is dispersed across a large geographic area. Respondents had the choice of completing the survey anonymously or declaring their identity to allow for follow up questions to be asked, if necessary. The purpose of the survey was two-fold:

a) To assess the state of adaptation planning in Caribbean SIDS.
b) To identify the barriers to adaptation planning in Caribbean SIDS

The results of the survey were further explored using semi-structured interviews with a select sample of senior policy makers from across the Caribbean.

[2] National focal point is the lead agency and or person responsible for dealing with climate change matters.

The questionnaire was divided into two segments. The first comprised of a series of closed and open-ended questions pertaining to various aspects of adaptation planning such as risk and vulnerability analysis, adaptation needs, and adaptation measures, etc. The second segment of the questionnaire comprised a list of thirty-one statements. Each statement represented a pre-defined barrier to adaptation based on an examination of the adaptation planning literature for SIDS (see Betzold, 2015; Bhave et al., 2016; Jones & Boyd, 2011; Kuruppu & Willie, 2015; Lata & Nunn, 2012; Butcher-Gollach, 2015; Mills et al., 2015; Pasquini et al., 2013; Robinson, 2017; Spires et al., 2014). The thirty-one statements were clustered into the seven categories of barriers outlined below and randomly distributed into two lists. Respondents were asked to rank each barrier based on the following response options: Very Significant (4); Significant (3); Partially Significant (2) Insignificant (1); Very Insignificant (0). The clustering of the barriers into seven categories was done to enable the analysis to look beyond the influence of individual barriers in the interpretation of the survey results. The clusters of barriers are as follows:

i) Perception and Awareness

ii) Communication and Collaboration

iii) Institutional and Governance Constraints

iv) Resource Constraints

v) Conflicting Scales

vi) Leadership

vii) Physical barriers

4.7.1.1 Survey Participants

The survey targeted the national focal point for climate change in each CARICOM member state, as well as the entire population of planners and policy makers from the respective planning departments in CARICOM member states. This included senior planners who function as key policy and decision makers. The entire population of planners was targeted because of the diverse composition of the Caribbean. It would be very challenging to get a representative sample of planners from each Caribbean territory, especially the very small territories where the planning departments are staffed by only a handful of individuals. Furthermore, planners in the Caribbean are not licensed and registered by a professional body as a requirement for practice, so there is no sure way of knowing exactly how many planners there are in the region. At best, one can only derive a crude estimate base on the size of each territory.

Where available, e-mail contacts were obtained from the websites of the planning departments in CARICOM member states. This was used to compile a list of public sector planners within CARICOM. In those territories with a national planning association, permission was sought to acquire and use the e-mail list of their members. Finally, the Caribbean Network for Urban and Land Management has a publicly available professional planners' directory which it created as part of a research project. This directory has contact information for several planners and other stakeholders in the urban and land sectors within the Caribbean. These three sources of information were used to compile a master list of 172 planners from across the Caribbean, who were invited to participate in an electronic survey via the software *'Survey Monkey'*. In addition, the snowball method or referrals was also used to disseminate the survey online. Respondents were asked to forward the link for the survey to other individuals whom they believed were suitable candidates to answer the survey questions. This was done to capture those planners that

were not on the e-mail list compiled by the researcher. Table 4.2 below outlines the attributes of the survey.

Table 4.2 Attributes of the Survey

Attribute	Number / Respondents
Total estimated population of planners	300
Survey invitations	172
Number of returns	60
Number of completed returns	51
Response rate (%)	29.6

Although the survey had a lower than anticipated response rate, it was able to capture the opinion of highly knowledgeable participants in over two-thirds of the CARICOM member states. These participants included senior policy makers such as the director and deputy directors of spatial planning within several CARICOM member states (n = 22), as well as national focal point officials for climate change who liaise with the UNFCCC and the Caribbean Community Climate Change Centre (CCCCC) (n=14), among other key individuals (n = 15) for a grand total of (n = 51). In this regard, the quality of the respondents who participated in the survey and the level information they provided helped to compensate for a lower than expected response rate.

4.7.2 Content Analysis

Content analysis is a research method used to analyze textual data (Hsieh & Shannon, 2005). This includes verbal, print, or electronic data obtained from a variety of sources such as policy documents, articles, interviews, focus group discussion, etc. Content analysis allows researchers to code and label information from secondary and primary data sources in a structured manner, so as to identify key themes and trends in the data (Palys & Atchinson, 2014). At a basic level, keyword counts are used to help identify and quantify themes that are present in

the body of a relevant text, but this does not provide any information regarding the underlying context in which the words are being used (Palys & Atchinson, 2014). At a more sophisticated level, content analysis explores the context in which keywords and phrases are situated to identify important themes and trends (Hammond & Wellington, 2013; Palys & Atchinson, 2014). In this regard, content analysis can be considered as both a quantitative and qualitative data collection method, depending on the level of analysis that is being conducted.

Hsieh and Shannon (2005) identify three distinctive approaches to content analysis: conventional, directed, and summative. Conventional content analysis does not rely on the use of predetermined keywords, categories and labels to assess the data. Instead, categories and labels are derived from the data. The process of analysis starts by reading all the data to get a general overview, followed by a more detailed reading, highlighting exact words from the text which capture key thoughts and concepts. As this process continues, categories and labels are developed based on the researcher's thoughts and impression of the text (Hsieh & Shannon, 2005). The primary advantage of conventional content analysis is that the researcher does not impose preconceived categories or theoretical perspectives in assessing the data. However, in the absence of predetermined categories and labels, conventional content analysis is vulnerable to the researcher's bias.

Directed content analysis uses predetermined codes to assess the data. These predetermined codes are derived from existing theory or prior research. Text that cannot be categorized is given a new code (Hsieh & Shannon, 2005). The strength of directed content analysis lies in its potential to provide supporting or non-supporting evidence for a theory and is therefore important to theory testing (Hsieh & Shannon, 2005). The disadvantage is that the use of predetermined codes can 'box in' the researcher, thereby limiting the scope of analysis.

Summative content analysis begins by identifying and quantifying keywords and phrases in a text to explore the extent of their usage. Word frequency counts for keywords and phrases are calculated. However, summative content analysis goes beyond mere word counts to include the process of interpreting the underlying meanings of the words and phrases (Hsieh & Shannon, 2005). Counting keywords and phrases are used to identify patterns in the data which form the basis for interpretation and inferring meaning.

This research employed the use of conventional content analysis. The purpose of the content analysis exercise was to assess national-level policy provisions for climate change adaptation in Caribbean SIDS. A conventional content analysis was chosen because it facilitated an exploratory assessment of climate change related policies, as opposed to directed and summative content analysis which have a rigid predefined scope of analysis. Two set of documents were included in the content analysis:

I. National vision and spatial plans – National vision plans and statutory national spatial plans that were five years old or less were selected. Planning legislation in most Caribbean SIDS requires that national spatial plans undergo mandatory review every five years in order to remain current (Toppin-Allahar, 2001). Although this is not a requirement for national vision plans, the same criterion was applied to ensure that both sets of plans met the same standard in terms of time frame. A total of ten plans which met this criterion were selected, including draft plans[3] which are awaiting official parliamentary approval.

[3] Draft plans can be used as material consideration to guide planning decisions.

II. National climate change policies and action plans - A total of thirteen national climate change policy and action plans were selected. These plans were selected on the basis of being multi-sectoral national-level policy instruments which exclusively address the issue of climate change. Hence, sector-specific climate change adaptation plans were excluded from the content analysis.

A detailed list of the documents included in the content analysis exercise can be found in Appendix H.

4.7.3 Semi-Structured Interviews

Interviews are conversations between a researcher and the participants involved in a study (Hammond & Wellington, 2013). Interviews are governed by ethical rules (protocols) and are conducted face to face, or remotely with the use of appropriate technology. Interviews can be classified into two categories: structured or semi-structured interviews. Structured interviews are characterized by close-ended questions in which interviewees are limited to a set of responses predefined by the researcher (Yin, 2011). Conversely, semi-structured interviews are not strictly scripted. Open-ended questions are used in semi-structured interviews to facilitate a conversational mode of communication between the researcher and the participant (Vanderstoep & Johnston, 2009; Willis et al., 2007; Yin, 2011). This is particularly useful for in-depth exploration of salient themes and issues (Palys & Atchinson, 2013). The major disadvantages associated with interviews are possible time and cost constraints (Palys & Atchinson, 2013).

Semi-structured interviews were conducted with senior regional policy makers, as well as national policy makers from selected CARICOM member states. The interviews were remotely conducted via Skype and telephone because the interviewees were dispersed across the

Caribbean, making it too costly and time-consuming to conduct direct face-to-face interviews. An interview protocol outlining the ethical procedures to be observed, a subset of topics relevant to the interview, brief probes, and follow up queries was developed. Interview protocols serve as 'conversation guides' for doing interviews (Yin, 2011). The interviews were transcribed and coded to help identify and analyze key themes and barriers related to adaptation planning in Caribbean SIDS.

4.7.3.1 Interview Participants

Policy makers for the semi-structured interviews were purposefully selected from among the survey participants. High-level policy experts with a wealth of knowledge and experience in climate change adaptation planning within the Caribbean were sought. Allowance was also made for referrals or snowball sampling to select participants for the semi-structured interviews. Experts initially identified through purposive sampling were asked to help identify other experts who may have valuable information to contribute to the study.

The interviewees were primarily drawn from those Caribbean SIDS which have recently updated their statutory national spatial development plan within the past five years or is actively in the process of doing so. This allowed for an in-depth analysis of how the issue of climate change and the barriers to adaption are manifested and addressed within current spatial development planning and policy frameworks in Caribbean SIDS. Fourteen Interview sessions involving senior policy makers from five Caribbean SIDS were conducted. Some interview sessions included a panel of interviewees, as much as four in one case. A total of 21 senior policy makers from across the Caribbean were interviewed, including policy makers serving as the national focal point or liaison for climate change in their respective countries.

4.8 Limitations of the Research Findings and Methodology

This research has the benefit of providing a high-level analysis of the state of adaptation planning and the barriers to adaptation in Caribbean SIDS. However, with high-level research covering a broad geographic area comes the challenge of balancing analytical scope with analytical depth. While this research provides an extensive breadth of analysis, it paints a high-level picture instead of a detailed analysis of the state of adaptation planning and the barriers to adaptation within a localized context, where certain details may otherwise not be revealed. This somewhat limits the application of the research findings primarily to national-level adaptation planning within Caribbean SIDS. Because the main focus is on national-level adaptation planning, as opposed to localized and sector-specific adaptation, explicit key takeaway points for local adaptation are limited. However, national-level policies influence local adaptation. Hence, the findings of this research still have implications for local adaptation in Caribbean SIDS.

The scope of this research also posed problems for data collection. Due to time, resources, and logistical constraints involved in gathering primary data from across a large geographic area, the survey was administered online and the interviews conducted remotely. This helped to minimize cost and time, but the lack of direct interpersonal communication between the researcher and the respondents contributed to a low response rate, as repeated follow up invitations and reminders were ignored by several potential participants. In some cases, some of the participants who were originally invited to participate in the research only responded after they got a second invitation from a known acquaintance via the snowball method. In addition, the use of an online survey also has the disadvantage of not providing visual and other sensory cues that are present during in-person interviews.

Philosophically, this research is grounded in a pragmatic epistemology. Consequently, a mixed method approach was used to gather and analyze the relevant data. This offered greater insights into investigating and understanding the research problem, rather than solely relying on either quantitative or qualitative techniques. However, the quantitative methods used in this research are limited to descriptive statistical analyses, as opposed to the use of inferential statistical analyses. Thus, it can be argued that to some extent this research falls short of the ideals of the mixed methods paradigm. Qualitative causal analyses were used instead of inferential statistics which does not necessarily establish causation.

Chapter Five
State of Adaptation Planning in Caribbean SIDS

5.1 Introduction

This chapter examines the progress towards climate change adaptation in Caribbean SIDS, more specifically CARICOM member states. It begins by examining the regional policy mechanisms which are in place to promote adaptation planning in Caribbean SIDS, and how they are operationalized. Content analysis results from an assessment of the current climate change policies in Caribbean SIDS are presented. The chapter then draws on the survey, and to a lesser extent, interview results to delve into an analysis of how national and local level adaptation planning is being undertaken in Caribbean SIDS. Part of this analysis involves an examination of the extent to which spatial planning agencies are involved in adaptation in Caribbean SIDS. By so doing this chapter provides a critique of the current state of adaptation planning in Caribbean SIDS – where they are now, and some of the priority issues which need to be addressed moving forward.

5.2 Regional Level Adaptation Planning

The principal policy instrument which guides CARICOM's response to climate change is the 2009 – 2021 Regional Framework for Achieving Development Resilient to Climate Change (CCCCC, 2009). The policy is accompanied by an Implementation Plan for the period 2011 – 2021, which is administered by the Caribbean Community Climate Change Centre (CCCCC) which has regional oversight responsibility for climate change issues (CCCCC, 2012). The Regional Framework outlines CARICOM's strategic vision for building resilience to climate change within Caribbean Society. The approach adopted by the Regional Framework jointly

considers adaptation and mitigation as part of the regional response to climate change. The mitigation component of the framework supports the creation of a green economy with renewable energy fuelling economic growth and development in the Caribbean. Most importantly, the Regional Framework serves a dual function by providing a platform for CARICOM to engage with international donor and aid agencies to solicit assistance for climate change planning, as well as being a roadmap for action by CARICOM member states. The framework seeks to:

1. mainstream climate change into the sustainable development agenda and work programmes of public and private institutions in all Caribbean Community countries at all levels;
2. promote systems and actions to reduce the vulnerability of Caribbean Community countries to global climate change wherever possible;
3. implement adaptation measures to address key vulnerabilities in the region, including enhancing the reliability of water supply systems, improving coastal and marine infrastructure, and adapting tourism infrastructure and activities to climate change;
4. promote measures to derive benefit from the prudent management of forests, wetlands, and the natural environment in general, and to protect that natural environment; and
5. promote actions and arrangements to reduce greenhouse gas emissions, including those aimed at energy-use efficiency by increasingly resorting to low-emission renewable energy sources (CCCCC, 2009).

The Implementation Plan outlines the pathway for achieving the strategic goals contained in the Regional Framework. The Implementation Plan:

- Establishes how regional and national bodies will work together

- Outline how financing will be secured to implement the regional framework
- Serves as a mechanism for engaging and obtaining buy-in from relevant stakeholders
- Proposes a monitoring and evaluation framework (CCCCC, 2012)

The Regional Framework supports the use of a variety of approaches to adaptation planning in CARICOM states. Nonetheless, where applicable the Regional Framework encourages the use of ecosystem and community-based approaches to adaptation, due to their cost-effectiveness, flexibility, and alignment with nature. This sentiment is widely shared as a normative ideal within the adaptation planning literature (see Dhar & Khirfan, 2016; Khan & Amelie, 2015; Mercer et al., 2012; Reid, 2015; Mycoo & Chadwick, 2012). However, the Regional Framework notes that the local adaptation context should ultimately determine the adaptation method chosen.

5.2.1 Operationalizing the Regional Policy Framework

Although the Caribbean Community Climate Change Centre (CCCCC) has oversight responsibility for climate change within CARICOM, implementation of the Regional Framework is reliant on the effectiveness of various regional, national, and to a lesser extent local institutional and governance arrangements. The Implementation Plan is predicated on series of time-bounded activities to be undertaken by national governments, various regional institutions e.g. CCCCC, CDEMA, CMO, and CIMH, as well as the private sector. The underlying assumption is that national governments, regional organizations, and the private sector have or will develop the capacity to undertake the activities necessary for implementing the Regional Framework. Interviews with senior policy makers from several CARICOM member states revealed that while capacity for climate change planning is being developed at the national level,

it is happening at a much slower rate than envisioned within the Implementation Plan. This has resulted in delays in implementing key components of the Regional Framework necessary for providing the foundation on which transformational change can be delivered. For example, national governments in CARICOM are required to develop within a two-year time span their own 'clearinghouse' facility with open access to data and information so that decision makers can make use of the best available scientific evidence. However, since the official approval of the Implementation Plan by the CARICOM heads of government in 2012, no national government has officially established its own clearinghouse facility for climate change. Likewise, CARICOM member states are expected to update their building codes and site development standards to help 'climate proof' development, but this process while in motion has been painstakingly slow. Essentially, the requisite institutional, administrative, and legislative environment does not currently exist at the national and local level to allow for the full-fledged implementation of the Regional Framework in a timely manner. This notwithstanding the gains that are being made in building adaptive capacity across all levels of planning within the Caribbean. This is also illustrative of the fact that while it is common for actions at higher levels of planning to constrain adaptation lower down the planning hierarchy, the reverse is also true whereby high-level policies can be thwarted by the lack of capacity lower levels of planning (see Amundsen et al., 2010; Daniell et al., 2011; Nalau et al., 2015).

The Implementation Plan for the Regional Framework acknowledges the issue of resource constraints, noting that CARICOM member states, regional organizations, and the CARICOM secretariat are over-tasked and under-resourced. High levels of indebtedness among CARICOM member states effectively mean that national governments have very limited resources for adaptation planning, more specifically investment projects to further both

development and adaptation. Over-reliance on international donor funding to drive adaptation planning within Caribbean SIDS and the need for greater self-sustaining and self-financing adaptation initiatives pose a serious challenge to the region. While implementation of the Regional Framework taps heavily into the international funding mechanisms available for SIDS such as the: Strategic Climate Fund (SCF), Least Developed Country Fund (LDCF), Adaptation Fund (AF), among others, local mobilization of resources by national governments is necessary to supplement available international funding.

As part of the Regional Framework, the CCCCC utilizes a project-oriented, and social learning approach to build adaptive capacity to climate change in the Caribbean. Available donor funding, as well as commitments from national governments in the Caribbean, are used to conduct pilot or demonstration projects in selected Caribbean territories. This is done with the objective of proving that certain interventions and technologies are workable and beneficial in addressing selected impacts of climate change within and across different sectors. This then becomes the selling point for a broader uptake of similar interventions within the Caribbean (Interviewee 1, personal communication, August 2017). Pilot and demonstration projects are targeted at the national, sectoral, and local levels. Where projects are undertaken at the community level, it is often a three-way partnership involving the CCCCC, national government, and NGOs. One current demonstration project is the 2014 -2018 Coastal Protection for Climate Change Adaptation in the Small Island States in the Caribbean. This project seeks to improve ecosystem services that reduce the impact of climate change on coastal areas, and is being rolled out in St. Lucia, Grenada, St. Vincent and the Grenadines and Jamaica (CCCCC, 2018).

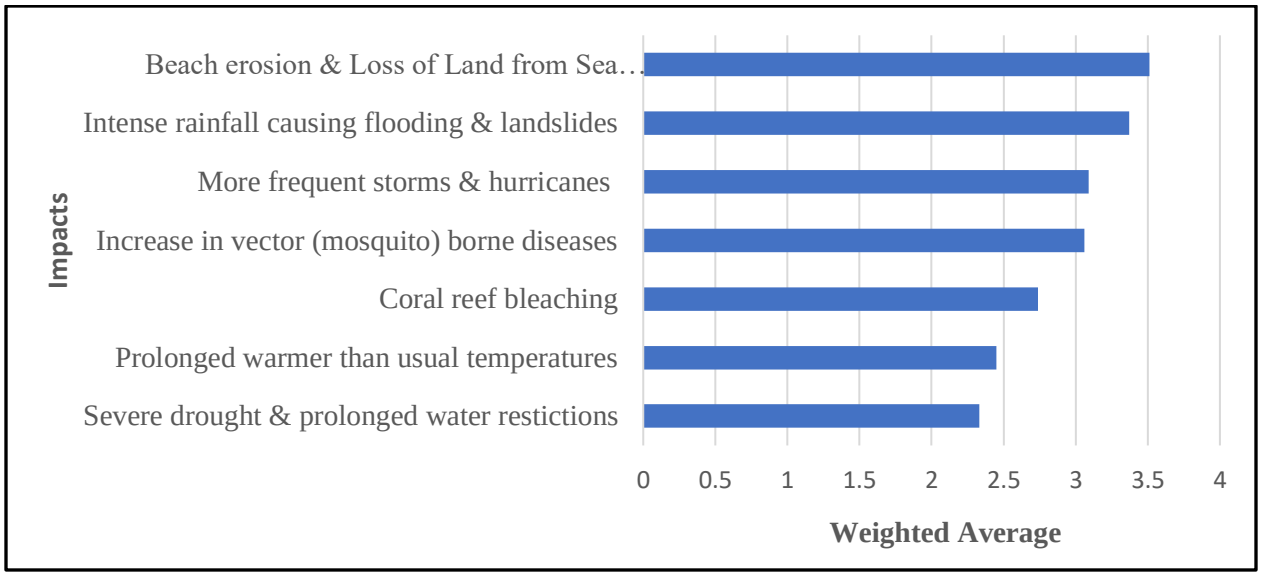
A major objective of the Regional Framework is reducing climate risk and vulnerability in CARICOM member states. The framework considers climate proofing and de-risking of

investments as an essential part of building resilience within Caribbean society. The CCCCC has developed a decision-making support tool, Caribbean Climate Online Risk and Adaptation tool – CCORAL, which lends support to the Regional Framework. This tool is intended to screen development proposals through a 'climate change lens', so as to identify measures that will minimize the adverse impacts of climate change and build resilience (CCCCC, 2013). The ultimate goal is for investors to be able to demonstrate to decision makers that climate resilience measures have been integrated into proposed development activities.

5.2.2 Impacts, Vulnerability, and Adaptation Responses in Caribbean SIDS

Caribbean SIDS are exposed to multiple interacting climatic hazards. The planners surveyed were asked to indicate the significance of various climate change impacts on coastal communities in their respective territories. The results reflect the weighted average for the responses which were plotted on a scale ranging from 4 to 0. The higher the weighted average, the more significant the impact is perceived to be. Planners cited beach erosion and land loss from sea level rise, as well as, flood damage and landslide from storm systems, as the most serious climatic hazards which threaten the Caribbean region. This is corroborated by the work of Simpson et al., (2010) whose simulation of sea level rise under various climate change scenarios showed that the Caribbean could suffer losses amounting to $US 4 billion annually if adaptation measures are not taken to address this sea level rise. Planners regarded severe drought conditions and warmer temperatures as the least severe impacts. (See Figure 5.1)

Figure 5.1 Climate Change Impacts in Coastal Caribbean Communities (n = 51)

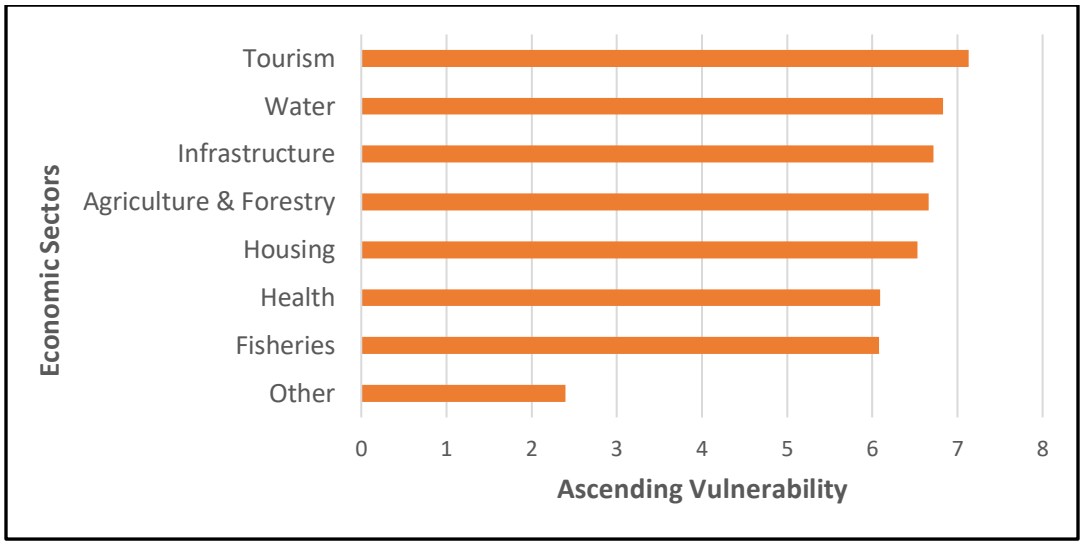


While the impacts of climate change adaptation can be easily enumerated, adaptation strategies for addressing climate change usually consider a combination of factors. This is because there are multiple drivers of climate change. For example, beach erosion can be attributed to a combination of both sea level rise and frequent storm surge. While specific impacts of climate change affect some sectors of society more than others, we cannot effectively respond to climate change on an impact by impact basis. To do so is to overlook the complexity of the repercussions of climate change, i.e. how climate change connects, as well as, impacts the various elements of nature and society. Best practice suggests the creation of multi-scalar, multi-sector, cross-cutting adaptation policies which address the drivers and impacts of climate change in a holistic manner (Adger et al., 2005).

Figure 5.2 ranks the vulnerability of key economic sectors within Caribbean SIDS. While climate change directly or indirectly affects all economic sectors within society, planners surveyed ranked tourism, water, and infrastructure as the three most climate-sensitive and vulnerable economic sectors within the Caribbean. Not only are these sectors highly vulnerable

to the impacts of climate change, they are also vital to the sustainable development of Caribbean SIDS. For example, in 2016 the total contribution of tourism and travel to the Caribbean economy was USD 54.6 billion or 14.9% of the region's GDP, with this figure projected to rise to USD 83.3 billion or 17% of GDP in 2027 (World Travel and Tourism Council, 2017). It is important to note that there is very little difference in the perceived level of vulnerability of the various economic sectors listed in Figure 5.2. This can be attributed to the fact that the different economic sectors are not mutually exclusive, but highly interrelated. However, with limited resources for adaptation, priority must be given to some sectors above others. The economic sectors mentioned in Figure 5.2 are also identified in the Regional Framework as priority areas which warrant urgent adaptation (CCCCC, 2009).

Figure 5.2 Vulnerability of Key Economic Sectors in Caribbean SIDS (n = 51)



An integral part of the adaptation planning process involves an appraisal of climate risk and vulnerability. Climate risk and vulnerability assessments studies are used to inform adaptation policies and projects. Climate risk and vulnerability assessments are usually undertaken as part of internationally funded adaptation related projects. The 2009 – 2011

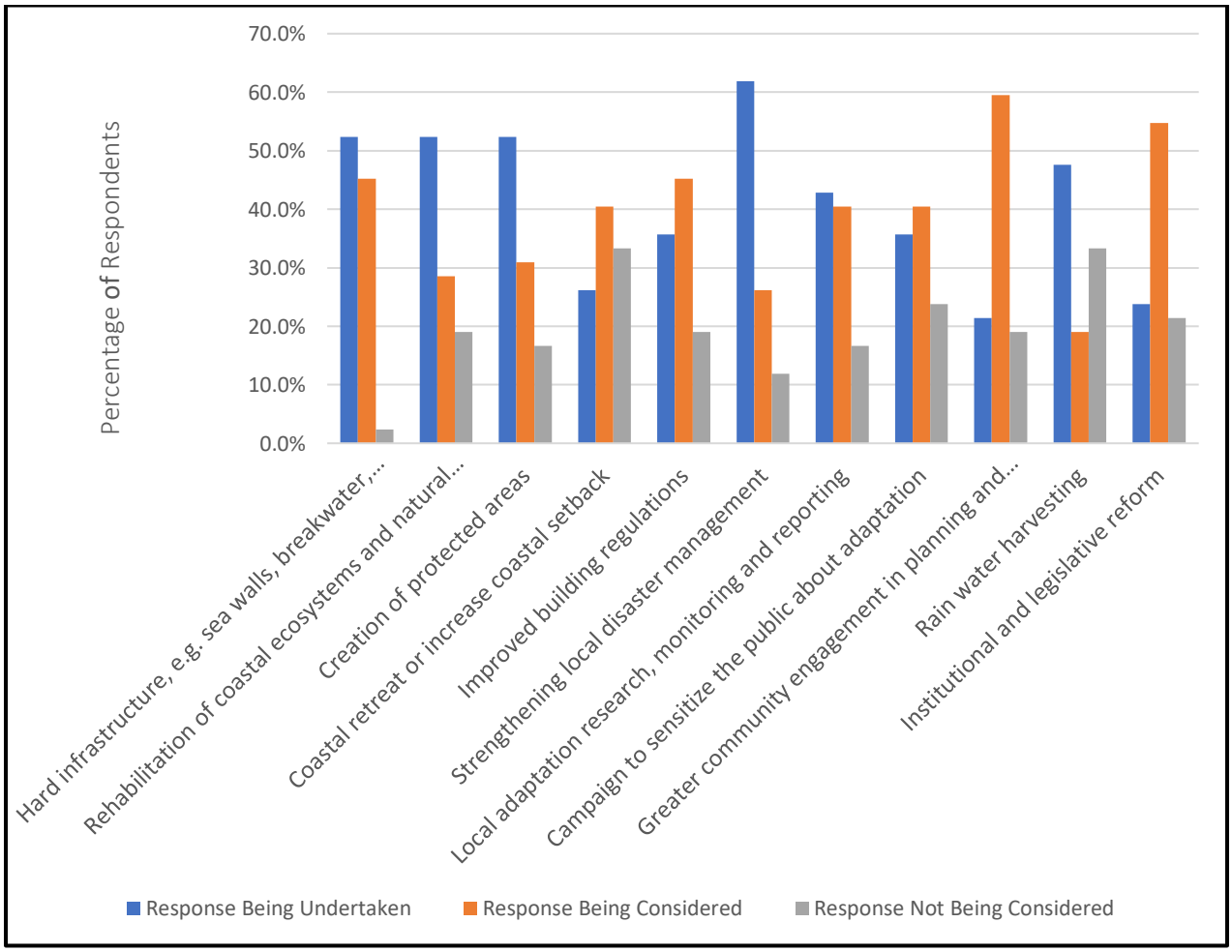
CARIBSAVE Climate Change Risk Atlas (CCCRA) project created full climate change risk profiles for 15 countries within CARICOM – outlining their respective risks, vulnerabilities, adaptive capacities, and strategies to reduce vulnerability and enhance resilience.

The concept of vulnerability is largely viewed in physical terms by many planning practitioners within the Caribbean. When asked to comment on the leading factors which cause vulnerability to climate change, the open-ended responses provided by the planners surveyed reflected the view that vulnerability is primarily the result of physical exposure to climatic hazards brought about by the poor location of public and private infrastructure, and the destruction of natural coastal defences, for example, mangroves. Socio-economic factors such as poverty, poor governance, lack of knowledge, unwillingness to change, and over-dependence on climate-sensitive sectors such as beach tourism, agriculture, and fisheries were not quite considered as influencing vulnerability to the same degree as physical factors. This reinforces the dominance of the risk-hazard model in adaptation planning within Caribbean SIDS. Under the risk-hazard model, limiting the physical exposure of individuals and systems to climatic hazards is the main method of addressing climate risk and vulnerability (Djalante et al., 2011; Mercer, 2010; O'Brien, O'Keefe, Rose, & Wisner, 2006; Sarrao-Neumann et al., 2015; Tompkins, 2005; Thomalla, Downing, Spanger-Siegfried, Han, & Rockstrom, 2006). Essentially, this approach heavily favours adaptation policies which focus on the physical impacts of climatic hazards, at the expense of the social determinants of exposure and sensitivity that underlies vulnerability to climate change.

Response measures to climate change adaptation are highly contextual. Diversity and differential vulnerability among local communities within Caribbean SIDS (see Rhiney, 2015) necessitates employing a variety of adaptation measures. Planners surveyed were asked to

indicate the measures being undertaken or considered to address climate change in coastal communities within their respective territories. The results outlined in Figure 5.3 show that adaptation in coastal Caribbean communities involves a pragmatic mix of hard and soft adaptation measures. In communities with extensive natural systems, soft approaches such as community and ecosystem-based adaptation are more applicable. In other cases, hard interventions are needed. Both soft and hard approaches work best when they complement each other, but often resource and capacity constraints within individual Caribbean SIDS invariably force favouring one approach over the other. Even then it is not an either-or situation, but a selective blend of approaches to address the diverse vulnerabilities of local communities.

Figure 5.3 Adaptation Measures in Coastal Caribbean Communities (n = 51)



The most common adaptation measures in response to climate change in Caribbean SIDS are: strengthening local disaster management, building hard infrastructure, e.g. sea walls, rehabilitation of coastal ecosystems and natural defenses, and the creation of protected areas. Most of the capacity for addressing issues related to climate change in Caribbean SIDS exists in the area of disaster risk management. Institutional, organizational, and policy mechanisms for disaster risk management within Caribbean SIDS have been in existence prior to the advent of climate change as a formal planning issue. However, with an increase in the number of climate change-related disasters within the Caribbean, disaster management has been further strengthened to minimize the loss of life from natural disasters. At the regional level, the Caribbean Disaster and Emergency Management Agency (CDEMA) serves as an inter-governmental agency which promotes Comprehensive Disaster Management, i.e. disaster relief, loss reduction and mitigation in CARICOM member states. At a national level, all individual CARICOM member states have established state agencies that are exclusively dedicated to addressing disaster management. These agencies work closely with various local community stakeholders and organizations, e.g. local government, churches, schools, and service clubs to mobilize and coordinate disaster relief and public outreach efforts. In Jamaica, recent legislation has been created to further strengthen the island's disaster management architecture. The Disaster Risk Management Act of 2015 makes the Office of Disaster Preparedness and Emergency Management (ODPEM) a statutory body with the power to undertake compulsory evacuation from areas deemed vulnerable to severe weather events such as hurricanes and tropical storms (Government of Jamaica, 2015a).

In terms of future adaptation, Figure 5.3 indicates that consideration is being mainly given to greater community engagement in adaptation planning and decision-making;

institutional and legislative reform, along with further use of hard infrastructure. Although traditional top-down approaches to adaptation favour the use of hard infrastructure, particularly in coastal communities, increasing attention is being paid to the use of bottom-up approaches such as community-based adaptation, and ecosystem-based adaptation. The strong dependency within Caribbean SIDS on ecosystems to support local livelihoods and provide vital ecosystem services suggest that practical preference should be given to community and ecosystem-based approaches to adaptation. Interviews conducted with senior policy makers from across the Caribbean pointed to the following benefits of utilizing community and ecosystem-based approaches to adaptation:

- Promote the use of natural environmental defences to protect against climatic hazards
- Cheaper to execute
- Involves a community dimension which frames adaptation and development goals from the perspective of local communities, promotes participatory planning, and helps secure local buy-in.
- More flexible in response to climate change impacts, thereby enhancing greater resilience.
- Utilizes local indigenous knowledge of environmental resource management

It is important to note that these are also characteristic features which the literature associated with best practices in adaptation planning (see Dhar & Khirfan, 2016; Khan & Amelie, 2015; Mercer et al., 2012; Reid, 2015; Mycoo & Chadwick, 2012).

5.2.3 Adaptation Priorities in Caribbean SIDS

Adaptation involves a range of actions related to various thematic issues which cut across multiple sectors of society. Content analysis of national climate change policies, as well as updated spatial development plans from respective CARICOM member states, was conducted to identify adaptation actions and trends in Caribbean SIDS. Adaptation actions were classified according to economic sectors, thematic areas, actors, and based on the stages involved in a rational-oriented adaptation planning process.

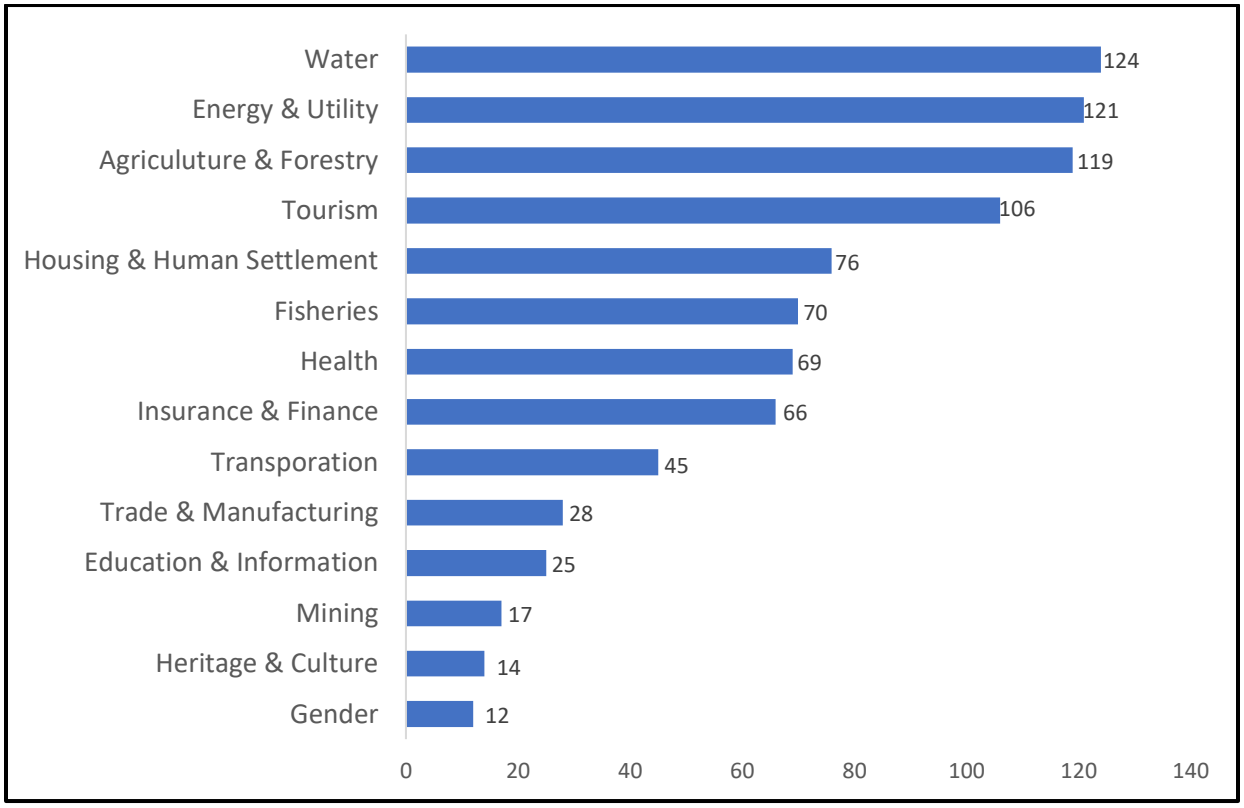
5.2.3.1 Adaptation Actions by Sectors

As shown in Figure 5.4, most of the adaptation actions identified in climate change policies from CARICOM member states are related to the water, energy and utility, agriculture and forestry, and tourism sectors. These sectors not only dominate the economy of the Caribbean but are also highly climate-sensitive and vulnerable to the effects of climate change. Regional Climate Models (RCM) suggest that increases in mean global temperature will result in less precipitation in several parts of the Caribbean (Campbell et al., 2011). This helps to explain why the water sector which is of critical importance to other sectors such as agriculture, tourism, and human settlements tops the list of priority areas for adaptation within CARICOM. Adaptation within the water sector is particularly important in Caribbean islands which lack surface water and are dependent on desalination plants to provide water to the general population and for their tourism industry. As one senior regional climate change policy expert who was interviewed noted:

> Most of our Caribbean islands are already water scarce islands, so as a result of that, we've got to be looking for alternatives to currently build resilience within our water

sector. So, it's not just the provision of more water, but water efficiency issues that we need to be concentrating on, as well as how we treat with wastewater (Interviewee 2, personal communication, August 2017).

Figure 5.4 Count of Adaptation Actions by Economic Sectors in Caribbean SIDS (n = 23)



When Figure 5.4 is compared with Figure 5.2 which indicates the vulnerability of key economic sectors in the Caribbean, it is clear that those sectors which the surveyed deemed as being most vulnerable to the effects of climate change are also the leading sectors which existing policies target for adaptation intervention. The notable exception is the energy and utility sector which features strongly in climate change policies in Caribbean SIDS. Actions related to the energy sector are normally linked to climate change mitigation, as opposed to adaptation. However, climate change policies within Caribbean SIDS jointly address both adaptation and

mitigation. This joint approach is considered as best practice and is based on the premise that policies which combine both adaptation and mitigation are more likely to be effective in the long term (Laukkonen et al., 2009). Several Caribbean SIDS such as Dominica, Anguilla, Cayman Islands, Barbados, the British Virgin Islands, and Guyana have embraced a low carbon climate resilient development strategy, both as an approach to sustainable development and a climate change policy. Energy, particularly the use of renewable sources, is the central policy focus. This accounts for the large number of climate change related actions targeted at the energy sector in Caribbean SIDS.

As part of the content analysis, adaptation actions in Caribbean SIDS were also examined in terms of thematic focus. The analysis revealed a three-pronged approach to adaptation which focuses primarily on the importance of disaster risk reduction and its relationship to resilience and sustainable development as key features of adaptation. Reducing the risks posed by climate change to all climate-sensitive sectors is considered as an essential prerequisite for creating a society that is resilient to the adverse impacts of climate change, as well as achieving sustainable development. With increased economic damage from climate change related disasters in the Caribbean (Acevedo, 2016), greater attention is being given to the relationship between climate change and disaster risk reduction, as well as disaster risk management. Using Barbados as an example, the 2017 draft Physical Development Plan notes that "Disaster risk reduction and climate change adaptation share the common foci of reducing national and community vulnerability and contributing to resilient and sustainable development in the face of climate variability and climate change" (Government of Barbados, 2017, p. 53).

Although the distinction between disaster risk reduction and disaster risk management has not always been clear in practice, policy makers within the Caribbean are now beginning to

differentiate between the two. Several of the policy makers interviewed acknowledged the need for the countries in the Caribbean to transition from short-term disaster risk management activities to long-term adaptation. This new thinking is also making its way into policy. The 2017 draft Physical Development Plan for Barbados explicitly acknowledges the need to transition from short-term disaster risk management interventions to long-term adaptation.

> Climate change impacts can affect the frequency, intensity, duration, timing, spatial distribution and extent of the severe weather events to which the island is exposed, increasing the associated risks. Climate change considerations, therefore, need to be taken into account in all governmental and private sector planning processes to ensure that adaptation and resilience building become a mandatory feature of all socio-economic, sectoral, and environmental development planning processes. In this way, DRR and CCA will be mainstreamed in development and programming, and disaster risk management will complete its transformation from short-term relief and response interventions to becoming a central element in the development process (Government of Barbados, 2017, p. 53).

The linkages between climate change, disaster risk reduction, and land use settlement patterns in protecting critical resources and key economic sectors upon which Caribbean SIDS depend are cogently expressed in recent spatial and socio-economic development plans from various Caribbean territories. The 2014 National Land Use Policy for Dominica seeks to increase the island's resilience to climate change by directing development into safe areas which do not put property at risk, as well as developing early warning systems (Government of Dominica, 2014). The policy is being implemented through a National Physical Development Plan which

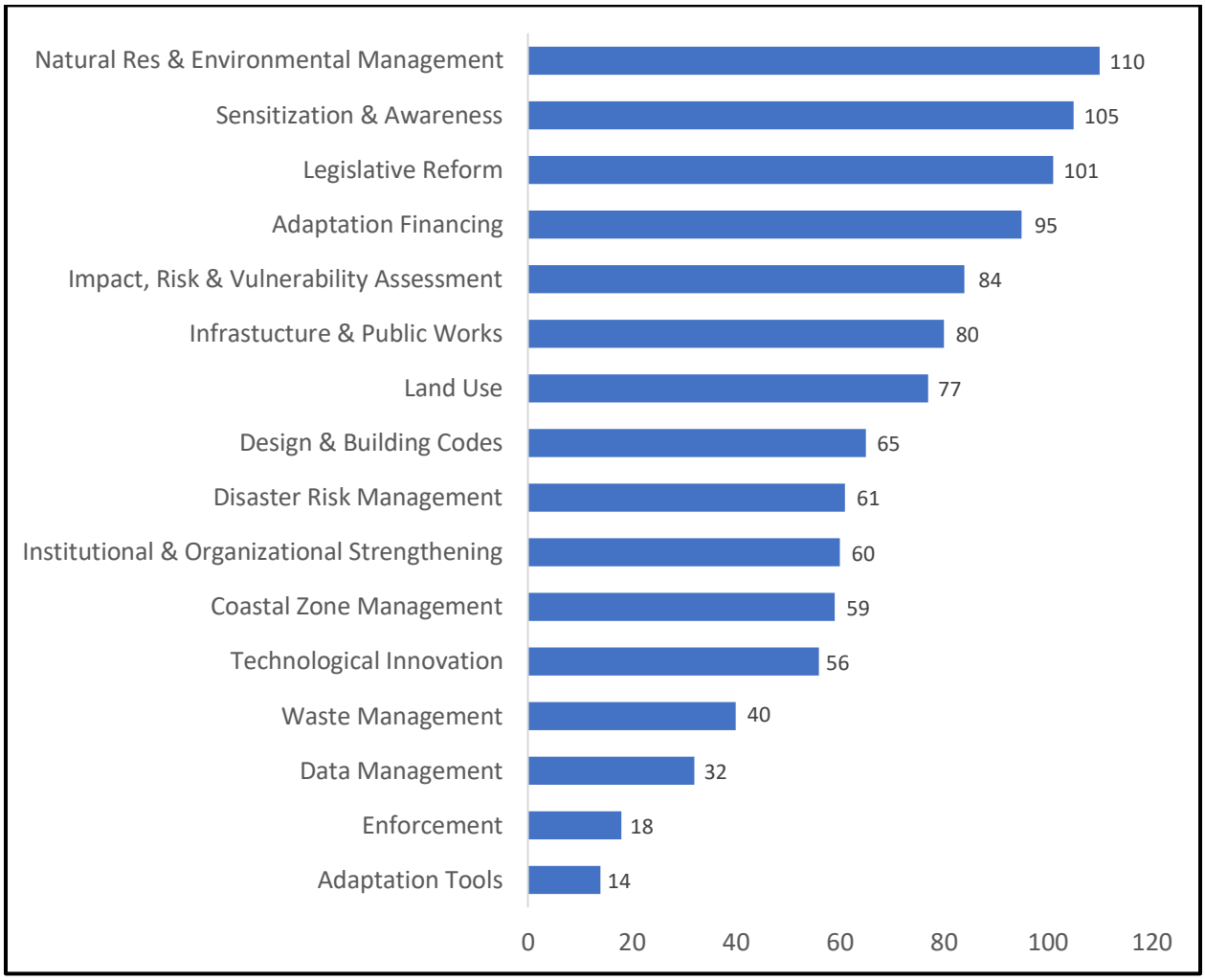
was prepared in 2016 but is awaiting official parliamentary approval[4]. The plan is expected to guide spatial development up to 2035 and focuses on the maintenance of the island's ecological integrity and biodiversity to build resilience and support eco-tourism on which the economy depends (Government of Dominica, 2016). Hazard risk reduction and adaptation to climate change is listed as one of the fifteen outcomes of Jamaica's Vision 2030 National Development Plan (Government of Jamaica, 2009). Similar sentiments are also expressed in the long-term vision plans of other Caribbean countries.

5.2.3.2 Adaptation Actions by Thematic Areas

Figure 5.5 quantify, according to thematic areas, the adaptation actions outlined in climate change policies of CARICOM member states. As highlighted in the preceding paragraphs, disaster risk reduction, resilience, and sustainable development are the three overarching themes which permeate climate change policy in Caribbean SIDS. Several sub-themes are subsumed within these three overarching themes. These sub-themes are presented in Figure 5.5.

[4] Plans and policies which are in draft format or which are awaiting official government approval can be used as material consideration in decision making, whereby relevant sections are taken into account by planners based on the circumstances.

Figure 5.5 Count of Adaptation Actions by Thematic Areas in Caribbean SIDS (n = 23)



Natural resources and environmental management is the major sub-theme present in climate change policy documents in Caribbean SIDS, followed closely by sensitization and awareness, legislative reform, and adaptation financing. Actions related to natural resources and environmental management focus primarily on the need to maintain healthy ecosystems in order to safeguard the provision of ecosystem services and support resource-dependent livelihoods in Caribbean SIDS. The emphasis on sensitization and awareness relates to public education about the impacts of climate change and the need for adaptation, as well as equipping technical

personnel with the requisite knowledge and skills to respond to climate change. Actions pertaining to legislative reform involve updating existing planning and environmental legislation, as well as creating new laws to address the legislative void which exist in addressing climate change adaptation and mitigation. This is part of a broader process of strengthening the legislative and institutional framework to support adaptation. The process also involves the creation of new organizational entities specifically tasked with addressing climate change issues, whose respective mandates are ideally defined in law. Progress is being made in creating state organizations to address climate change. Belize, Guyana, and Jamaica are three Caribbean countries which have each established a national climate change office which exclusively focus on climate change issues. However, these organizations are not established in law but are the creation of cabinet decisions.

Securing ongoing financing for adaptation is also a keen area of focus within climate change policy in Caribbean SIDS. The emphasis is on the need to create domestic sources of financing to lessen the existing over-reliance on international donor funding to drive adaptation in Caribbean SIDS. The imposition of local carbon and environmental taxes is proffered as a potential source of domestic financing to support adaptation. Among those Caribbean SIDS which have imposed direct environmental taxes are Belize, Bahamas, Barbados, Jamaica, Guyana, Suriname, and Trinidad and Tobago. The government of Jamaica has a 0.5% Environmental Protection Levy which is charged on all goods imported into the country, as well as the sale of locally manufactured goods (Government of Jamaica, 2015b). The Jamaican government also implemented a carbon tax on petrol in 2016 as part of its mitigation measures against climate change. The interview exercise later revealed that there is a challenge in directing monies raised from environmental taxes in Caribbean SIDS into adaptation and mitigation

activities. This is because there is no specific legislation in place to manage these taxes which are lumped together with other general taxes in a consolidated revenue fund (Interviewees 1, 2, 16, 20, & 21., personal communication, August 2017).

Risk assessment, as a thematic focus of climate change policy within Caribbean SIDS, is a part of a larger effort to climate proof development and build resilience to climate change in the region. This effort also involves embracing new technological innovations by improving building codes and design standards for planning, upgrading public infrastructure to better withstand extreme weather events, and improved zoning to promote more efficient land use. Another aspect of climate risk is disaster risk management. Activities related to disaster risk management are not considered as adaptation in the climate change literature. However, climate change policy within Caribbean SIDS does not clearly distinguish between disaster risk management and adaptation. Disaster risk management is also considered as a response measure to climate change. Implementing early warning systems to help in anticipating and preparing for climate-related disasters was a key recommendation put forward in several policy documents as a strategy to help improve resilience to climate change in Caribbean SIDS.

Although coastal areas in Caribbean SIDS are highly vulnerable to the effects of climate change, such as sea level rise, storm surge, beach erosion, and flooding, adaptation actions exclusive to coastal zone management are limited compared to other thematic areas. At face value, this seemingly suggests that coastal areas are not a priority focus of climate policy within Caribbean SIDS. While Caribbean SIDS such as Barbados and Belize have a coastal zone management unit along with policies and legislation which are exclusive to their respective coastal zones, most other Caribbean SIDS do not make an explicit policy distinction between coastal zone management and broader realm of environmental management, inclusive of

terrestrial and marine environments. This is why the content analysis results identified a limited number of actions which are exclusive to coastal zone management.

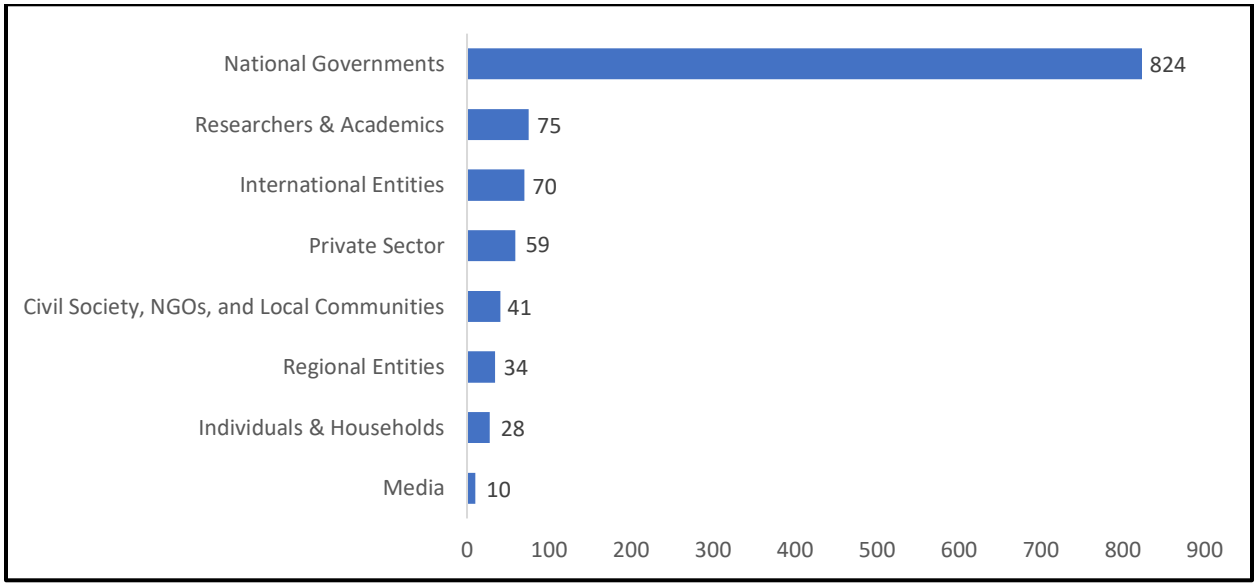
Data management, enforcement of planning and environmental regulations, and the development of adaptation tools are the thematic areas with the lowest number of adaptation actions. Besides the Caribbean Community Centre for Climate Change (CCCCC) which serve as a repository and clearinghouse for climate change information within the Caribbean, individual Caribbean SIDS do not have their own national data-sharing platform to disseminate climate change information to government agencies, the private sectors, and individuals. Establishing mechanisms and protocols for data sharing and management is regarded as an imperative within climate change policy documents from Caribbean SIDS. However, detailed actions are severely lacking. Although the lack of enforcement of planning and environmental regulations is acknowledged as a barrier to adaptation in Caribbean SIDS, policy provisions contain few explicit actions to address this issue. With regards to adaptation tools, the actions outlined largely focus on risk screening using Environmental Impact Assessments (EIAs) and, to a lesser extent, online risk screening tools.

5.2.3.3 Adaptation Actions by Actors

Figure 5.6 shows that a huge disparity exists between the number of adaptation actions involving the state and those involving non-state actors. This suggests that there is both a state-centred and a state-driven approach to adaptation policy in Caribbean SIDS. There are limited direct policy provisions outlining the role of the private sector as a key economic and social player in advancing adaptation in Caribbean SIDS. At the household level where the basic building blocks of adaptation are laid, direct policy provisions are extremely few. The same

pattern holds true for adaptation at the community / municipal level, keeping in mind that municipal level climate change plans are largely non-existent in Caribbean SIDS, where there is an over-reliance on national level adaptation planning instruments to drive local adaptation.

Figure 5.6 Adaptation Actions by Actors in Caribbean SIDS (n = 23)

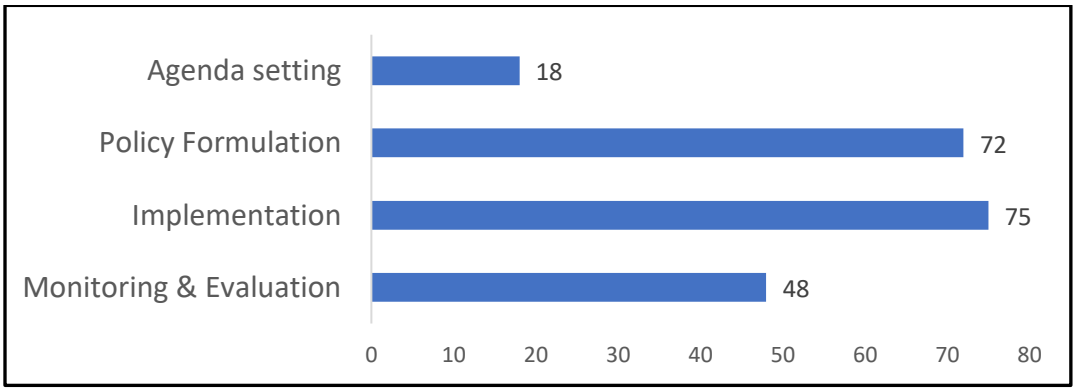


Actions involving researchers and academics focus mainly on undertaking various forms of impact, risk and vulnerability assessments to support adaptation decision making. Despite the presence of a Regional Policy Framework to facilitate adaptation and mitigation in Caribbean SIDS, national level climate change policies allude more to the role of international donor agencies in assisting with adaptation, compared to regional entities. This is because the resources for implementing the Regional Policy Framework are largely derived from international donor agencies. Overall, more direct involvement in adaptation by non-state actors is needed to redress the imbalance which currently exists between state and non-state actors.

5.2.3.4 Adaptation Actions and the Stages of the Planning Process

The final component of the content analysis involved an assessment of adaptation actions based on the stages involved in a rational oriented adaptation planning process. Adaptation actions outlined within climate change policy documents were categorized based on the stage of the planning process which they best fit into. The results are shown in Figure 5.7.

Figure 5.7 Count of Adaptation Actions RE: Stages of the Planning Process (n = 23)



The most commonly identified actions are related to the policy formulation and implementation stages of adaptation planning. The need to create and implement new policies and regulations to explicitly address specific aspects of adaptation and mitigation is a major recommendation in several policy documents. The proposed policies and regulations are nested within high-level umbrella policies. The gap between the number of actions targeted at policy formulation and implementation, compared to monitoring and evaluation confirms the view that monitoring and evaluation is a neglected component of adaptation planning (see Preston et al., 2011; Tang et al., 2010). Although the agenda-setting stage has the least number of adaptation actions, the main sentiment expressed in the policy documents was that climate change is already reasonably established on the planning agenda in Caribbean SIDS.

5.3 National Level Adaptation Planning

5.3.1 Policy Development

The national framework for adaptation planning in respective CARICOM member states is comprised of a suite of policy instruments, as opposed to a single unitary policy framework. This is also highlighted in section 3.6.2. The suite of policy instruments includes a mix of the following:

a) UNFCCC National Communications or reports
b) National climate change strategies and action plans
c) Sectoral adaptation plans
d) National sustainable development vision plans
e) National physical/spatial plans
f) Medium-term socio-economic frameworks

UNFCCC National Communications are used by respective Caribbean SIDS to outline their greenhouse gas inventories, mitigation, and adaptation priorities. These communications are mandatory reporting requirements for Caribbean SIDS who are signatories to the UNFCCC, and in this regard do not strictly constitute a domestic policy instrument for addressing climate change. Domestic policy instruments such as national vision plans, national spatial plans, and sectoral adaptation plans are used across Caribbean SIDS to help mainstream climate change adaptation and mitigation into national and local development. However, relying on disparate policy instruments to guide adaptation and mitigation can potentially lead to policy incoherence and fragmentation. The need for an overarching framework to streamline adaptation and

mitigation efforts is gradually leading to the creation of national climate change strategies and action plans. This does not replace sector-based adaptation planning, but rather integrates adaptation planning across multiple sectors.

By creating specific plans and policies to address climate change adaptation and mitigation, the issue of climate change is gradually becoming an established policy domain at the national level in Caribbean SIDS. A senior regional climate policy expert interviewed stated:

> We believe that starting with a policy and having a plan is always best, rather than it (*climate change*) being just appended to something because then it becomes almost like a bastard child. You know? It's hanging out there without anybody giving it the kind of attention it requires (Interviewee 1, personal communication, August 2017).

International donor funding has been very instrumental in the creation of national climate change policy instruments in Caribbean SIDS, legislation, as well as the establishment of organizational mechanisms to address climate change. In reference to the Caribbean, an interviewee pointed out that "All our countries are signed on to the UNFCCC, and under that, we are supposed to develop adaptation plans, strategies, and policies. And, in fact, under the UNFCCC framework, they have $US 3 million per country to do that" (Interviewee 2, personal communication, August 2017).

As outlined in section 3.6.2, medium term socio-economic frameworks spanning 3 – 5 years are among the most important national planning instruments in Caribbean SIDS because they serve as the principal policy mechanism for enacting the national growth and development agenda. While climate change adaptation measures are built into long-term strategic vision plans which are incrementally rolled out via medium-term policy frameworks, the critical question is: to what extent is adaptation being incorporated into existing medium-term policy frameworks?

Interviews with several senior policy makers from across the Caribbean suggest that climate change adaptation is not high on the list of short and medium-term priorities of Caribbean governments, which tend to focus on large-scale capital investment projects. The failure to explicitly incorporate climate change adaptation measures into medium-term socio-economic policy frameworks helps to explain why the linkages between adaptation and sustainable development are partly obscured in planning practice within Caribbean SIDS. This contrasts sharply with the way in which adaptation is framed within national climate change policies, vision plans, and spatial plans in Caribbean SIDS. As the content analysis results in section 5.2.3.2 reveal**,** adaptation is rightfully framed as a central pillar of sustainable development. However, as illustrated above there is a dichotomy between planning policy and actual planning practice, as the urgent need for economic growth and development to reduce poverty and unemployment essentially dominates the planning agenda in Caribbean SIDS. This takes place at the expense of environmental concerns, including climate change, which is often sacrificed in the quest for short-term economic growth and development.

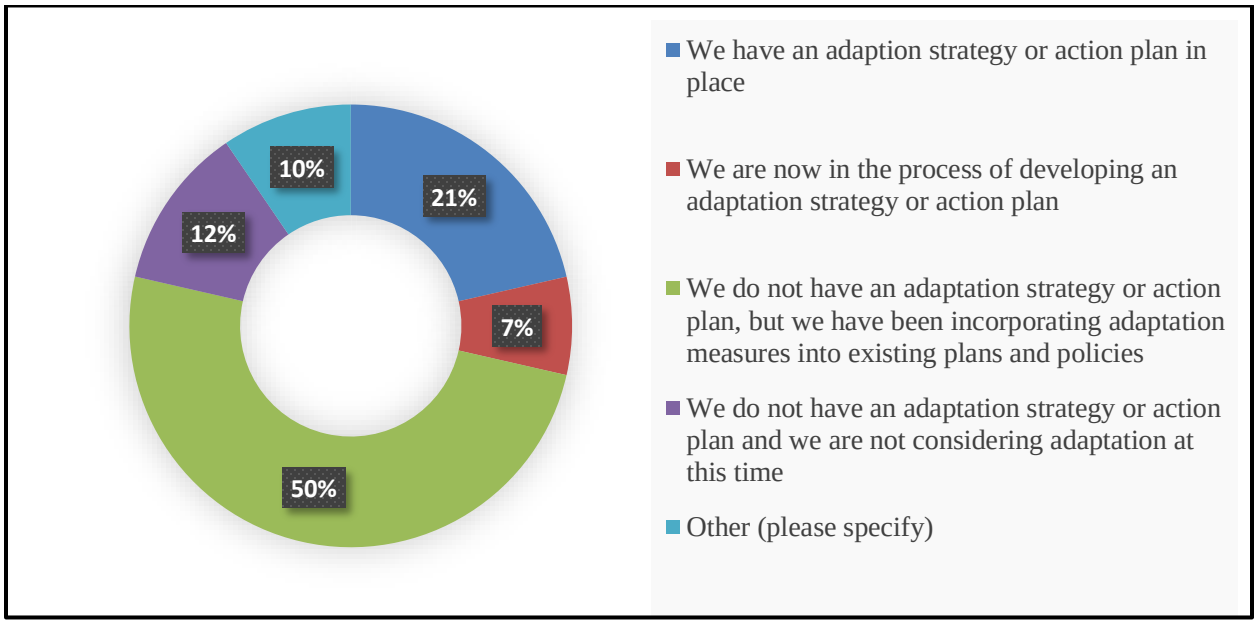
5.3.2 Spatial Planning Agencies and Climate Change Adaptation

5.3.2.1 Adaptation Action Plans

This subsection examines the involvement of national spatial development planning agencies in climate change adaptation planning across CARICOM member states. It does so by looking at the extent to which adaptation action plans are being utilized by national-level planning agencies. Planners surveyed were asked to indicate whether or not their agency has an active climate change adaptation strategy or action plan. The results outlined in Figure 5.8 indicate that adaptation action plans are absent in most national planning agencies within CARICOM member states. The absence of explicit adaptation action plans within planning

agencies in CARICOM member states should not be interpreted to mean that there is very little or no adaptation planning activities taking place within these agencies. Because adaptation is not a stand-alone activity, the preferred approach is mainstreaming adaptation measures into existing planning regulations, as opposed to pursuing adaptation as a separate planning activity. Where planners reported having an adaptation plan within their agency, it was more a case of utilizing the existing national adaptation plan or strategy, rather than having their own tailor-made adaptation plan. In addition, the mandate of planning agencies does not require them to undertake adaptation specific planning but rather general spatial development planning, inclusive of adaptation.

Figure 5.8 Use of Adaptation Plans among Planning Agencies in Caribbean SIDS (n = 51)



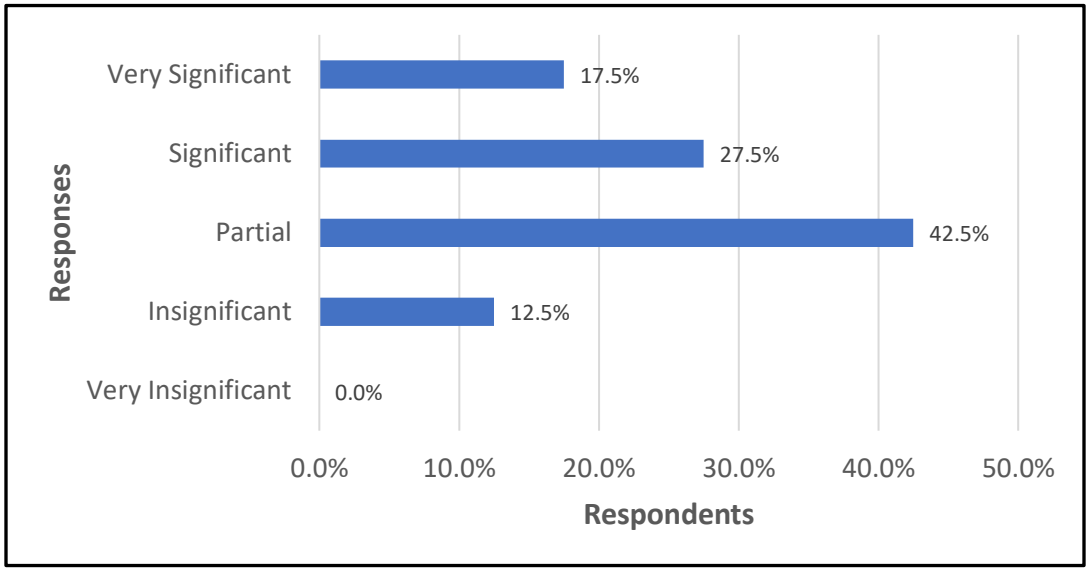
The lack of organizational and planning capacity is also a contributory factor to the limited use of adaptation action plans within national spatial planning agencies. Much of the time and resources of spatial planning agencies within Caribbean member states are used to address issues related to development control, as opposed to development planning (i.e. policy making).

Development planning activities such as creating development plans and policies are usually outsourced to local and international planning consultants and are typically paid for using international donor funding or loans. In other words, if the internal capacity for creating up-to-date development plans and policies is lacking within spatial planning agencies, it is unreasonable to expect that these agencies would have explicit adaptation plans. Strategic policy making for climate change adaptation and mitigation extends beyond the scope of spatial development planning agencies. As indicated in Table 3.1, oversight responsibility for climate change within the Caribbean resides outside of the respective national spatial planning agencies. This normally falls under the purview of one of the following ministries: Ministry of the Environment, Office of the Prime Minister, or the Ministry of Economic Planning and Sustainable Development.

5.3.2.2 Importance Attached to Mainstreaming

The importance attached to climate change influences the extent to which mainstreaming of adaptation takes place. Planners surveyed were asked to share their opinion on the level of consideration given to mainstreaming adaptation measures into development plans and policies within their country. The results are shown in Figure 5.9 overleaf.

Figure 5.9 Consideration Given to Mainstreaming Adaptation (n = 51)



The results show that a combined 55% of the planners surveyed felt that only partial or insignificant consideration is given to mainstreaming adaptation into development plans and policies. The remaining 45% are of the view that significant or very significant consideration is being given to mainstreaming adaptation into planning within coastal communities. Although 55% of the planners surveyed are dissatisfied with the effort being made to mainstream adaptation into planning, this does not constitute an overwhelming majority. The remaining 45% who think that significant or very significant consideration is being given to mainstreaming adaptation suggest that progress is being made in advancing adaptation. However, the results also suggest that there is still a fair amount of work to be done in this regard.

A range of internal and external activities are undertaken by spatial planning agencies within Caribbean SIDS to promote climate change adaptation. Planners surveyed were asked to indicate if any formal climate change discussion (e.g. workshops, sensitization, and expert meetings) has been taking place within their respective planning agencies. Just over 70% of the planners indicated yes, while the others said no. Those planners, who said yes, went on to

describe the nature of these discussions. Most reported that the climate change discussions and activities within their respective agencies focused on the following:

- making use of impact analyzes and vulnerability assessment studies to identify vulnerable areas and adaptation measures;
- policy development, primarily at the national level. In a few cases, this also included revising and updating the national building code; and
- capacity building through various training sessions and sensitization workshops focusing on multiple climate change related issues.

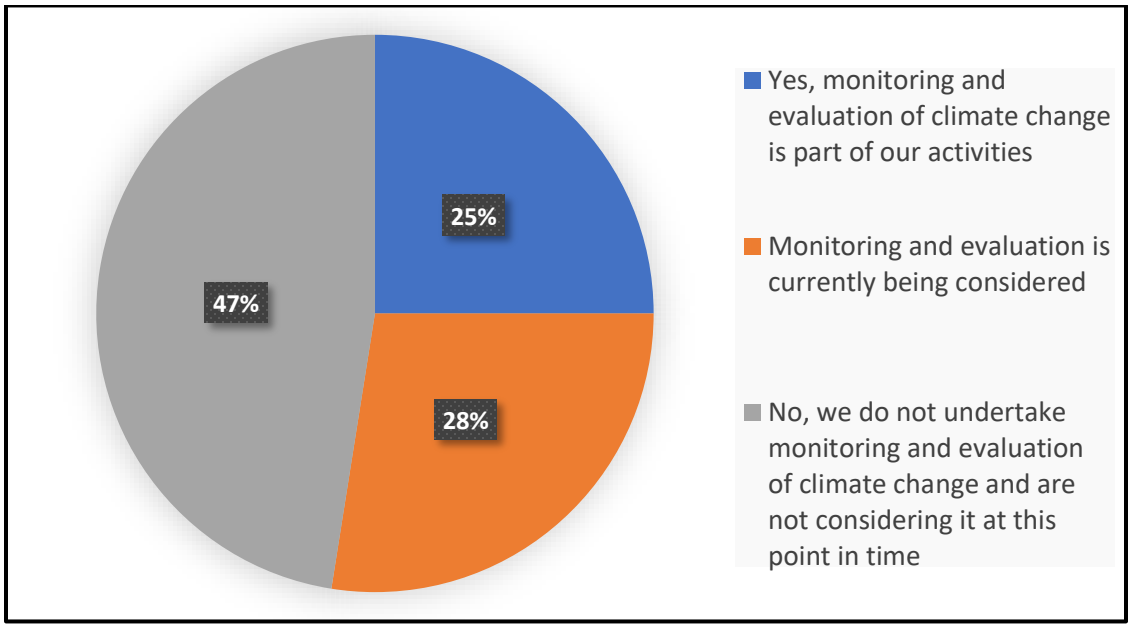
Subsequent interviews with senior policy makers from across the Caribbean revealed that these activities largely take place as part of internationally funded adaptation projects, and lack on-going financial support outside of receiving donor funding.

5.3.2.3 Monitoring and Evaluation of Adaptation

Monitoring and evaluation of adaptation has traditionally lagged behind the other components of adaptation planning, as attested to in the adaptation planning literature (see Preston et al., 2011; Tang et al., 2010). Planners surveyed were asked to indicate if their respective planning agencies are involved in any form of monitoring and evaluation of climate change impacts and adaptation policy initiatives. Approximately half of the planners (47%) indicated that the planning agency to which they are employed is not involved in monitoring and evaluation of adaptation and is neither considering it now. Twenty-eight percent (28%) of the respondents indicated that some amount of consideration is being given to monitoring and evaluating climate change but offered no details as to what those considerations entail. Only 25% of the respondents mentioned that the planning agency to which they belong are involved in

monitoring and evaluation of climate change. Interviews with policy makers from across Caribbean SIDS revealed that monitoring and evaluation are largely confined to project evaluation, as opposed to policy and plan evaluation. Ex post-project evaluation is a requirement for donor-funded adaptation projects. Hence when adaptation projects are evaluated, the evaluation is framed to meet the terms of reference of the funding agency, rather than focusing on local impacts and outcomes. The closest example of policy and plan evaluation is the mandatory requirement to review and update statutory spatial development plans every five years. Even then, there are no firmly established indicators to guide the review process, which most times is not undertaken within the stipulated time period.

Figure 5.10 Monitoring and Evaluation of Adaptation by Planning Agencies in Caribbean SIDS (n = 51)



Besides the evaluation of adaptation projects, annual reporting by various state agencies provide an indirect avenue for evaluating the progress that is being made towards climate change adaptation. These reports provide information on various planning activities, some of which are

related to climate change adaptation and mitigation. One such example is Jamaica's State of the Environment Report produced by the National Environment and Planning Agency (NEPA). The report provides an overview of the current state and quality of Jamaica's environment and its natural resources.

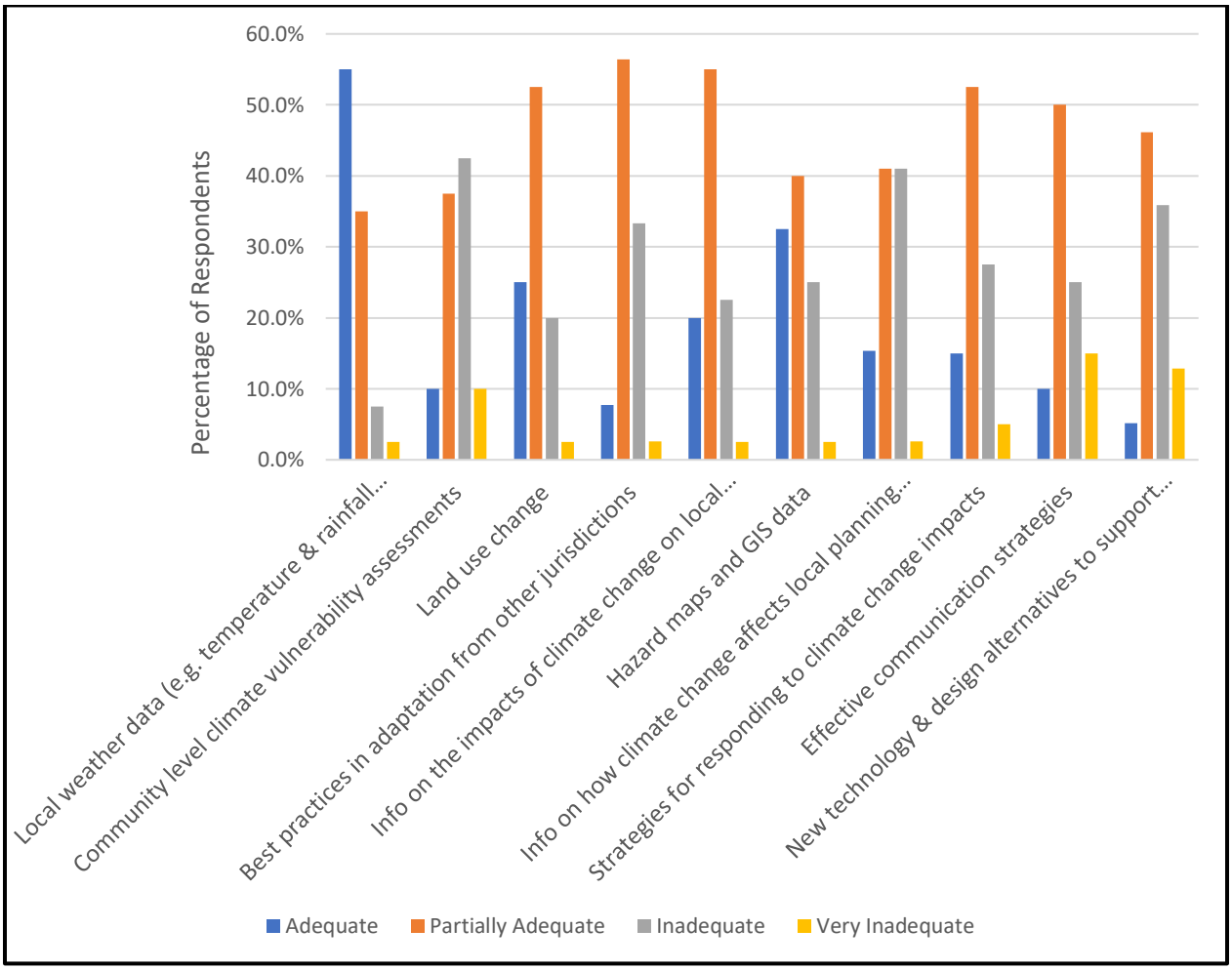
A major challenge with regards to the monitoring and evaluation of climate change adaptation is defining and articulating the indicators which can be used to determine successful adaptation. Interviews with policy makers reveal that the indicators that are presently used to monitor and evaluate adaptation within the Caribbean primarily focus on loss of life and damage to property, for example, damage cost by climatic hazards as a percentage of Gross Domestic Product (GDP), and the number of lives lost due to extreme weather events. The assumption is that the less damage accrued and fewer lives lost indicates that successful adaptation is taking place.

Overall, it must be noted that the adaptation planning process within the Caribbean is still in the early stages of development. Consequently, there is very little direct monitoring and evaluation of adaptation taking place. However, there is some emerging evidence that this may start to change, as some of the more recent development plans and policies in the Caribbean such as Dominica's Land Use Policy and National Physical Development Plan have a climate change component which includes indicators for monitoring and evaluation.

5.3.3 Data Management and Information Support for Adaptation

The availability of pertinent and timely climate change data and information is important to inform all stages of adaptation policy making. Planners surveyed were asked to rate the level of information available to their planning agency. The responses are shown in Figure 5.11. Overall, the areas in which information is most lacking to support adaptation are community-level vulnerability assessments, new technology and design alternatives to support adaptation, and information on how climate change affects local planning and management. As indicated in section 3.6.2 adaptation policy making is largely undertaken at the national level. Hence the use of vulnerability assessments to inform adaptation policy mainly takes place at the national level. Where community-level vulnerability assessment exists, they are primarily used to inform local adaptation projects. Although vulnerability differs across space and time, the size of many Caribbean SIDS makes it unfeasible to undertake vulnerability assessment and adaptation planning at the level of individual communities, given that in some cases entire islands can be spatially and functionally considered as one big community. Planners also felt that current planning and design standards are inadequate to deal with climate change; hence the need for the use of more climate-friendly technologies and design standards. While there is an abundance information on climate change, planners indicated that there was a paucity of local contextually relevant information to guide adaptation planning.

Figure 5.11 Availability of Data and Information to Support Adaptation Planning (n = 51)



Effective communication strategies to convey the urgency of climate change to the public and elected officials are deemed to be very inadequate. Without effective communication strategies, getting the requisite buy-in from all stakeholders will prove difficult, even when policies are robust and well informed by the latest scientific data. This highlights the importance of not only having access to pertinent scientific data but the ability of policy makers to use that scientific data to develop clear policy narratives which can be easily communicated to stakeholders. This is necessary to keep climate change in the minds of political leaders and members of the public. A senior policy maker interviewed opined that: “Information for

decision-makers *(i.e. politicians)* needs to be packaged in a way that is attractive and palatable so that they can see it as useful" (Interviewee 6, personal communication, August 2017).

A key point highlighted during the interviews with policy makers is that much of the climate change related data presently available, though useful, is static and does not capture real-time changes as they occur on the ground. Interactive mapping and real-time data is a challenge in many Caribbean territories. Furthermore, data is scattered across various agencies with no established protocol for data management and sharing. This points to the need for a central clearinghouse within each Caribbean territory to manage information from the various government agencies. There have been on-going discussions within various Caribbean territories on how to address the issue of data management to support planning and development. For example, the Planning Institute of Jamaica (PIOJ) is seeking to develop a climate risk information platform which will provide information on adaptation planning and risk management to various government agencies (Interviewees 7, 8, 9, & 10., personal communication, August 2017).

5.4 Local Level Adaptation Planning

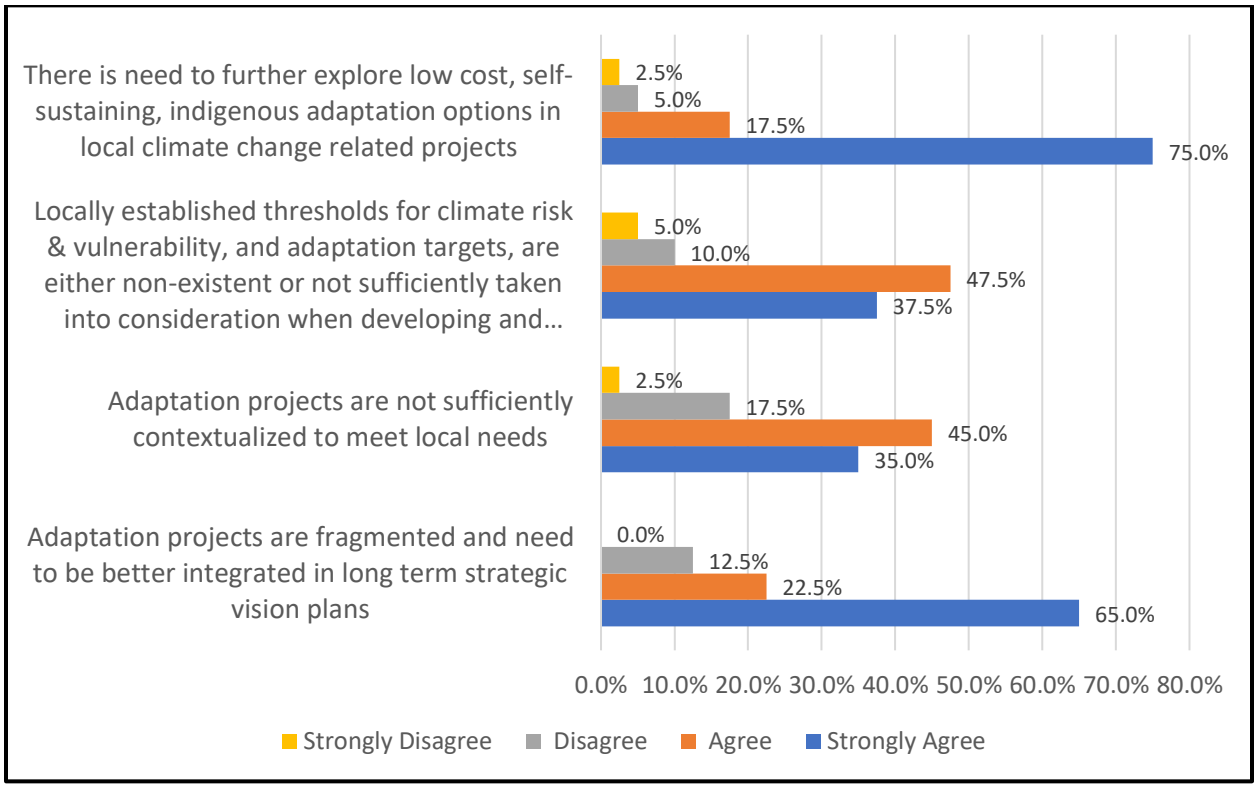
5.4.1 Adaptation Projects

In the absence of well-developed formal systems of local government with the capacity to undertake substantive policy making and implementation, local climate change adaptation planning in Caribbean SIDS is akin to undertaking various community-level adaptation related projects. National level adaptation policies in Caribbean SIDS are to a large extent implemented by means of local adaptation projects. Essentially, projects lie at the heart of local climate adaptation planning in Caribbean SIDS. The effectiveness of adaptation projects is therefore of critical importance to the success of national adaptation policies. Figure 5.12 outline planners'

perception of various shortcomings that are associated with adaptation related projects in the Caribbean. Planners surveyed were asked to share their views on a list of statements describing adaptation projects within the Caribbean. Predefined responses were provided and assessed using a Likert scale. The major deficiencies identified were over-reliance on external funding to drive adaptation projects, and the need to better streamline adaptation projects within a strategic planning framework. The other deficiencies – establishing thresholds for climate risks and further contextualizing adaptation projects to meet local needs also warrants attention. Thresholds for climate risks are useful in informing building codes and site development standards. Further contextualizing adaptation project ensures that the needs of all stakeholders within the community are met, particularly those that are most vulnerable.

Resource constraints and the over-reliance on international financing for adaptation have resulted in the practice whereby adaptation planning is frequently undertaken as one-off projects. The inability to carry out adaptation planning on an on-going basis makes it more difficult to mainstream adaptation in a timely manner. Another challenge is that high-level national policy instruments are sometimes too vague to meaningfully guide local community level adaptation projects. Hence, while specific adaptation projects may be in keeping with national level policy guidelines, they can potentially be unsuitable for the local community.

Figure 5.12 Shortcomings of Adaptation Related Projects in Caribbean SIDS (n = 51)



To avoid duplication of adaptation efforts by different planning agencies, and to ensure that adaptation activities are mutually reinforcing, it is necessary that adaptation initiatives be linked to a strategic policy framework which guides the adaptation process. Although improvements are being made in streamlining adaptation projects, at best there is partial integration of adaptation within Caribbean SIDS. One policy maker interviewed stated "I am not sure that there is a conscious integrated effort towards adaptation projects. I do believe that we have done some of it. Some of it almost unconsciously and others in an ad hoc manner" (Interviewee 2, personal communication, August 2017).

The need to better streamline adaptation projects has not escaped the attention of policy makers in Caribbean SIDS. Effort is being made to address this situation. For example, the

Sustainable Development Unit in St. Vincent and the Grenadines is actively creating an inventory of the various climate change related projects undertaken within the country (Interviewee 20 & 21, personal communication, September 2017). As part of its public-sector modernization programme, the Jamaican government has created the Public Investment Management System (PIMS) which aims to streamline the preparation, appraisal, approval, and management of all government projects in Jamaica, regardless of the source of funding, the type of procurement or implementation method used.

5.4.2 Local Implementation of Development Standards

The implementation of development standards through the planning approval process is an aspect of planning which lends support to local adaptation but is often overlooked. The implementation of spatial, as well as socio-economic development plans is largely undertaken through the planning approval process, as well as public and private decisions regarding the economic sectors, types of investments, and location of development activities. Based on the type of development application, the requisite conditionalities which safeguard against environmental degradation and encourage climate change adaptation are imposed by the various regulatory agencies. Through the planning approval process, adaptation related measures appended to various planning regulations can be brought to bear on spatial development in Caribbean SIDS. In other words, the planning approval process is critical to downscaling national-level adaptation policies and making them operational in terms of on-the-ground spatial development at the community level. This lies at the heart of the nexus between spatial planning and climate change adaptation.

As part of the planning approval process, development applications are typically reviewed by various government departments which examine the proposed development against their sectoral policies and development standards. This is where the extent to which adaptation related policies are integrated across different sectors is practically tested, i.e. the planning approval process should not allow development which adheres to one set of environmental and design standards, while simultaneously undermining another set of standards. Policy makers interviewed repeatedly cited implementation, as opposed to policy development as the major challenge to adaptation planning in Caribbean SIDS. This and other barriers to adaptation are addressed in more detail in chapter six.

5.5 Emerging Best Practices in Adaptation Planning in Caribbean SIDS

Best practices in adaptation planning are highly contextual, in that what may be considered as best fit in one community or country may not necessarily be the best fit within another. However, as noted in Table 2.1 there are certain principles which underpin best practices in adaptation planning, particularly within the context of SIDS. Adaptation best practices enable or support integrated planning, flexible and robust policies, safeguard local development and livelihoods, facilitate participatory and multi-stakeholder engagement, involve the use of both indigenous and scientific knowledge, build local adaptive capacity and resilience, as well as protect and conserve local environmental resources.

Content analysis of national climate change policies and interviews with policy makers indicate that various elements of best practices are beginning to emerge in climate change adaptation and mitigation initiatives in Caribbean SIDS. Attempts are being made to better streamline and integrate adaptation at different levels of planning and across multiple climate

sensitive socio-economic sectors. The ongoing attempts within various Caribbean SIDS at creating national climate change policy frameworks and action plans seek to promote a structured approach to mainstreaming adaptation and mitigation. As illustrated in the mini case study in Box 2, new institutional and organizational arrangements in the form of specialized climate change agencies have been created in various Caribbean SIDS to help strengthen the mainstreaming process. Examples include the National Climate Change Office – Belize, Office of Climate Change – Guyana, and the Climate Change Division – Jamaica.

The Coastal Zone Management Unit in Barbados uses scenario-based planning to guide physical development within Barbados' coastal zone. A one in a hundred-year storm surge flood is used as a threshold for assessing coastal development applications. This helps to ensure that policies are robust. In the review of development applications, consideration is given to factors such as the preservation of biodiversity, reducing vulnerability to coastal hazard, and preserving the general character of the area (Interviewee 15, personal communication, August 2017).

Various adaptation projects seek to utilize a multi-stakeholder participatory approach to assessing climate risk and vulnerability as part of the response to climate change. Emphasis is placed on maintaining ecosystem services and protecting local livelihoods as part of building local adaptive capacity and resilience to climate change. For example, the UNEP sponsored Risk and Vulnerability Assessment Methodology Project (RiVAMP) combines scientific and local indigenous knowledge via a stakeholder consultation process to assess the importance of ecosystems in disaster risk reduction, climate change adaptation, and sustainable development. Piloted in the coastal community of Negril, Jamaica in 2009 - 2010, RiVAMP specifically target SIDS and other coastal areas that are highly vulnerable to various climatic hazards. This project seeks to help policy makers promote sustainable development through ecosystem management.

Box 2: Jamaica's Climate Change Policy Framework and Action Plan

Approved by parliament in 2015, Jamaica's Climate Change Policy Framework and Action Plan is primarily intended to support the goals of Vision 2030 - National Sustainable Development Plan by reducing the risks posed by climate change to all sectors of the Jamaican economy and stated development goals. The general objective of the Framework is to create a sustainable institutional mechanism to facilitate the development, coordination, and implementation of policies, sectoral plans, programs, strategies, policies and legislation to address the impacts of climate change. The Framework also identifies the adaptation and mitigation challenges facing Jamaica in the short, medium, and long term.

Among the specific objectives and strategies of the Framework are:

- Mainstreaming adaptation and mitigation into national development policies
- Institutional support for the development of research, technology, training and data management to improve decision-making for sectoral adaptation plans
- Promotion of consultative processes to improve public participation adaptation and mitigation planning
- Development of mechanisms to incorporate climate change into ecosystem management and land use planning.

The Framework is implemented by the Climate Change Division (CCD) within the Ministry of Economic Growth and Job Creation. The CCD has oversight responsibility for climate change adaptation and mitigation in Jamaica. There is a climate change focal point network comprising appointees from all government ministries, selected departments and agencies, representatives of civil society and the private sector. Focal points are responsible for managing, monitoring, evaluating and reporting on the development of their sectoral strategies and actions with respect to climate change. Cross-sectoral climate change strategies are also collectively developed, implemented and monitored by the CCD.

The Framework is underpinned by the following guiding principles:

1. Sustainable use of natural resources
2. Multi-sector approach to adaptation planning
3. Public participation and collaboration
4. Precautionary approach
5. Transparency and accountability
6. Best science
7. Polluter pays principle

Monitoring and evaluation of the Framework takes the form of quarterly reports from the focal points and annual report to cabinet by the CCD.

5.6 Summary and Conclusion

Data from the content analysis, survey, and interviews were used to present an overview of the state of adaptation planning at the regional, national, and local level in Caribbean SIDS. While the Regional Framework for Adaptation is intended to guide national governments of Caribbean SIDS in their adaptation efforts, it is non-binding and is not formally linked to national-level policies. The results revealed that adaptation planning is primarily undertaken at the national level in Caribbean SIDS due to the absence of local planning capacity and limitations of size. National-level policies frame adaptation as a central pillar of sustainable development planning, however evidence from planning practice suggest that short-term economic imperatives dominate the planning agenda. In the absence of meaningful systems of local governance, local adaptation is characterized by ad hoc projects. From a sectoral perspective, adaptation actions are primarily targeted at the water, tourism, and agriculture sectors – the economic lifeblood of the Caribbean region.

Having outlined the state of adaptation planning in Caribbean SIDS in this chapter, the next chapter looks at the barriers in Caribbean SIDS. Multiple examples of barriers are examined. This paves the way for the discussion in chapter seven which merges the findings outlined in chapters five and six.

Chapter Six
Barriers to Adaptation Planning in Caribbean SIDS

6.1 Introduction

This chapter examines the perceived barriers to planned adaptation encountered by planners and policy makers in Caribbean SIDS. The data presented is derived from a survey of planners within CARICOM member states, as well as, interviews with senior policy makers as outlined in sections 4.7 and 4.8.

The chapter begins by identifying and analyzing the sources of the barriers to adaptation as manifested in the Caribbean SIDS context. The barriers identified are ranked in order of their perceived significance in an attempt to determine the main barriers to adaptation. The chapter then moves onto a qualitative analysis of the interrelationship among the barriers to adaptation in Caribbean SIDS, identifying causal linkages which exist between the different barriers. To understand how the barriers impact adaptation planning, the barriers identified are assessed in relation to the different stages involved in a rational oriented adaptation planning process, i.e. agenda setting, policy formulation, policy implementation, monitoring, and evaluation. Lastly, to help identify intervention measures, the barriers to adaptation in Caribbean SIDS are assessed using Moser and Ekstrom (2010) diagnostic framework. The chapter concludes by reiterating the findings which suggest that most of the barriers to adaptation within Caribbean SIDS are deemed to be significant and are highly interrelated. In addressing the barriers to adaptation, the interrelationship among the barriers, and the dynamics of the local policy environment are more important factors to consider than the ranking assigned to the barriers.

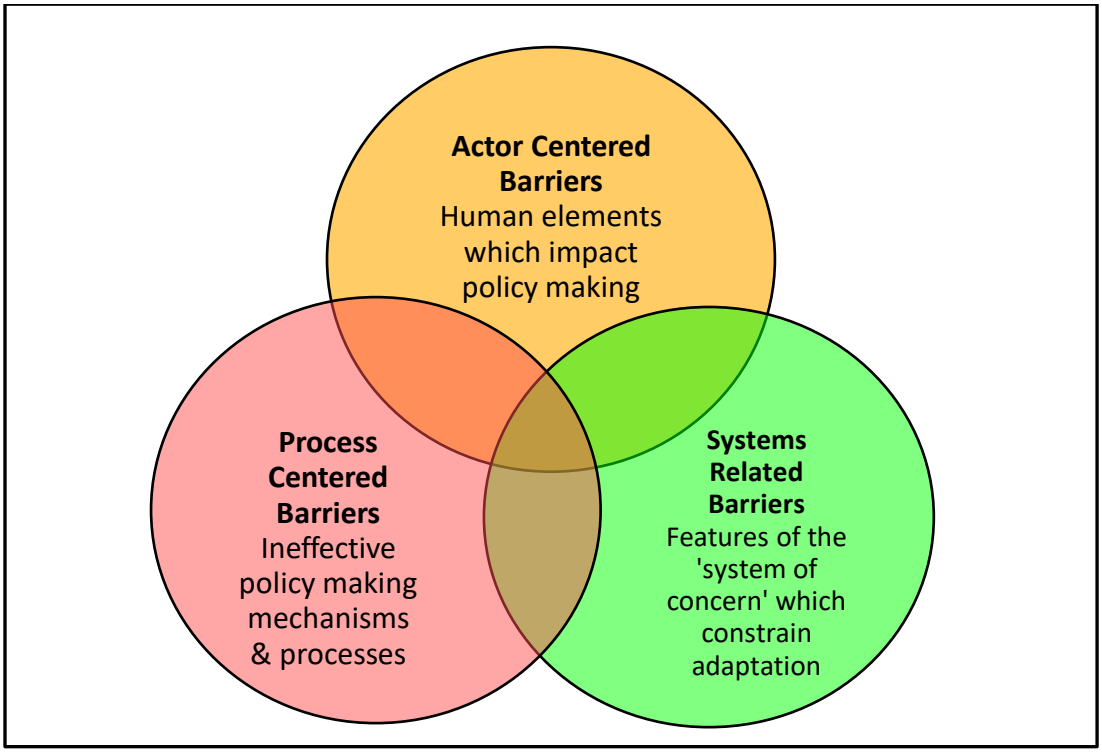
6.2 Deconstructing the Barriers to Adaptation

Unpacking the barriers to adaptation is integral to understanding and enhancing adaptation decision-making across multiple scales of governance and at different levels of planning. The various analytical frameworks for assessing the barriers to adaptation, such as those proposed by (Biesbroek et al., 2014; Eisenack et al., 2014; Hamin, 2012; Moser & Ekstrom 2010) essentially suggest that barriers stem from three principal variables or factors:

a) The actions of decision-makers and other stakeholders – Actor-centred barriers.
b) The institutional and governance processes through which public policies are developed and implemented – Process-centred barriers.
c) The nature of the system that is at risk from climate change and needs to be adapted, i.e. barriers related to the 'system of concern'.

Figure 6.1 outlines the analytical framework used for identifying the sources of the barriers to adaptation in Caribbean SIDS. To get a balanced understanding of the barriers to adaptation, joint recognition needs to be given to the role of actors, the efficacy of decision-making processes, and the 'system of concern'. The use of the following three-pronged analytical framework allows for an analysis of the sources of the barriers to adaptation in Caribbean SIDS – barriers which encompasses both the human and non-human dimensions of adaptation planning.

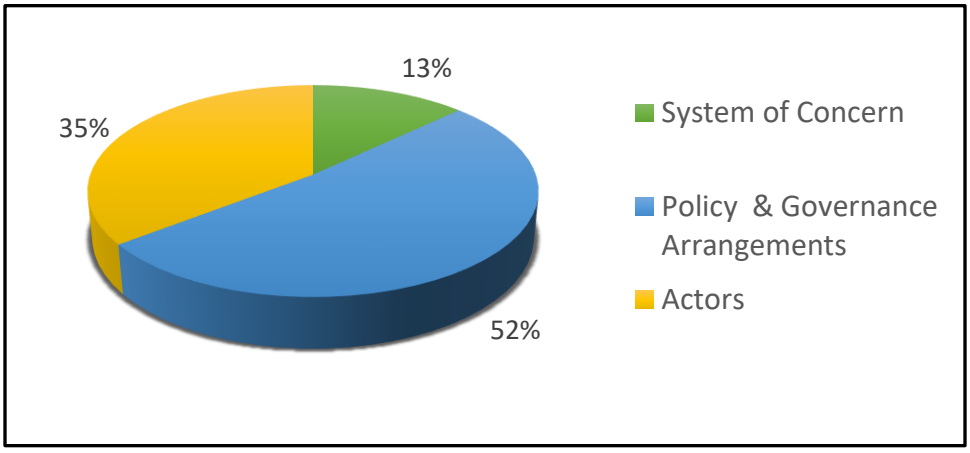
Figure 6.1 Analytical Framework for Assessing the Sources of the Barriers to Adaptation



Source: Informed by Biesbroek et al., (2013); Eisenack et al., (2014); Ekstrom & Moser (2014)

A survey was created using a list of thirty-one predefined barriers drawn from the adaptation planning literature (see Appendix A, for a list of the barriers). Each barrier was mapped to one of the sources of adaptation barriers depicted in Figure 6.1. Although some of the barriers are linked to more than one source, the major source to which a barrier is linked was used in this exercise. The results of which are shown in Figure 6.2.

Figure 6.2 Sources of Adaptation Barriers in Caribbean SIDS (n = 31)



The most common source of perceived barriers stems from ineffective policy and governance arrangements. These barriers are commonly referred to as institutional barriers within the adaptation planning literature, where they receive widespread attention (see Dovers & Hezri, 2010; Ekstrom & Moser, 2014; Lawrence et al., 2015; Leck & Roberts, 2015; Measham et al., 2011; Spires et al., 2014). Conflicts among the actors involved in adaptation decision making is also a considerable source of barriers. These actors include politicians, developers, planners, among others, who are motivated by different values and interests. The low percentage of barriers (13%) emanating from 'systems of concern' suggest that the characteristic features of the various economic, social, and environmental sectors in which adaptation takes place are not perceived as a major reason for the occurrence of barriers to adaptation planning in Caribbean SIDS.

6.3 Assessing the Barriers to Adaptation in Caribbean SIDS

Planners surveyed were asked to score the significance of each of the thirty-one barriers listed in the survey. This was done using a modified five-point Likert scale: "very significant" = 4; "significant" = 3; "partially significant" = 2; "insignificant" = 1; "very insignificant" = 0. The

thirty-one barriers were grouped into seven categories for ease of analysis and randomly distributed into a list of statements within the survey. The seven categories of barriers are (1) perception and awareness, (2) communication and collaboration, (3) institutional and governance constraints, (4) resource constraints, (5) conflicting scales, (6) Leadership, and (7) physical barriers.

Table 6.1 Grouping of Barriers to Adaptation in Caribbean SIDS

No.	Category of Barriers	Barriers per Category	Weighted Average
1	Physical Barriers	2	3.17
2	Resource Constraints	5	3.05
3	Institutional & Governance Constraints	9	3.05
4	Conflicting Temporal & Spatial Scales	3	3.05
5	Leadership	2	3.00
6	Communication & Collaboration	3	2.80
7	Perception & Awareness	7	2.53

Higher weighted average scores indicate that greater significance is attached to the barriers. The similarity of the weighted average scores suggests that there is not a great difference in the significance which planners attach to the different categories of barriers.

6.3.1 Breakdown of the Barriers to Adaptation Planning in Caribbean SIDS

The top ten individual barriers which scored the highest are presented in Table 6.2. The barriers were scored on a scale from 4 to 0, indicating the decreasing significance. Barriers scoring between 3.20 – 4.00 were interpreted as very significant; 2.40 – 3.19 significant; 1.60 – 2.39 partially significant; 0.80 – 1.59 insignificant; 0 – 0.79 very insignificant.

Table 6.2 Top Ten Ranked Barriers to Adaptation in Caribbean SIDS

Rank	Barrier	Weighted Average
1	No established budget to undertake community-level adaptation planning.	3.46
2	Lack of political will and commitment.	3.38
3	Lack of an explicit mandate or requirement for planning agencies to undertake local adaptation planning.	3.36
4	Weak enforcement of existing planning regulations.	3.36
5	Encroachment on ecologically sensitive and hazard-prone lands.	3.36
6	Current development challenges overshadow long-term climate change adaptation.	3.26
7	Differences between short-term planning and project cycles and long-term climate change projections and impacts.	3.18
8	Absence of a clearly defined adaptation planning process for local communities.	3.13
9	Inability of vulnerable households to afford insurance coverage.	3.13
10	Institutional fragmentation, i.e. unclear and overlapping mandates, lack of clarity on responsibility, leadership roles, turf issues, etc.	3.10

It is important to note that the scores of the top ten individual barriers are very close, with some barriers sharing identical scores. This suggests that although some barriers rank higher than others, the difference in scores is of such that there is no single overwhelmingly dominant barrier which warrants priority and urgent intervention above all other barriers. Six of the top ten barriers were scored as very significant by the planners surveyed. The remaining four were scored as significant. The absence of an "established budget to undertake community-level adaptation planning" was ranked as the single most significant barrier to adaptation. On face value, this reinforces what is common knowledge in the adaptation planning literature that the lack of financial resources is a major barrier to adaptation in SIDS and the wider developing world (see Betzold, 2015; Mimura et al., 2014; Medeiros et al., 2011; Spires et al., 2014). However, this barrier specifically speaks to the lack of financial resources for community-level adaptation, for which there is no formal established planning mandate in Caribbean SIDS.

Without a clearly defined and established local adaptation planning process in place to guide community-level adaptation, it is unlikely for planning agencies to have an established budget specifically designated to undertake community-level adaptation planning. Hence, the absence of an established budget to undertake community-level adaptation, though ranked as the number one-barrier, may in fact be a symptom of a bigger issue of not having effective institutional and governance mechanisms in place to facilitate community-level adaptation. This highlights the importance of examining the barriers to adaptation in an integrated manner to fully understand their cause and effects.

The second most significant barrier to adaptation identified by the planners surveyed was the "lack of political will and commitment". The perception among the planners is that political leaders in Caribbean SIDS - the ultimate decision makers, are not doing enough to address climate change. This suggests that local political leaders in Caribbean SIDS may need to show more tangible commitment to climate change adaptation, to remove the negative perception of failing to do enough to address adaptation. Other very significant barriers to adaptation that were noted are the inability to enforce existing planning regulations, illegal and informal settlements, as well as, encroaching on ecologically sensitive land, e.g. coastal wetlands.

The inability of a vulnerable household to afford insurance coverage to safeguard against climate-related hazards, such as hurricanes and flooding, though ranked among the top ten barriers, was deemed as a significant barrier as opposed to a very significant barrier. While home insurance allows for vulnerable homeowners to recoup the losses incurred from climate-related disasters, high levels of poverty and very limited disposable income in Caribbean SIDS have effectively removed insurance as a viable adaptation measure for many homeowners.

Table 6.3 Bottom Ten Ranked Barriers to Adaptation in Caribbean SIDS

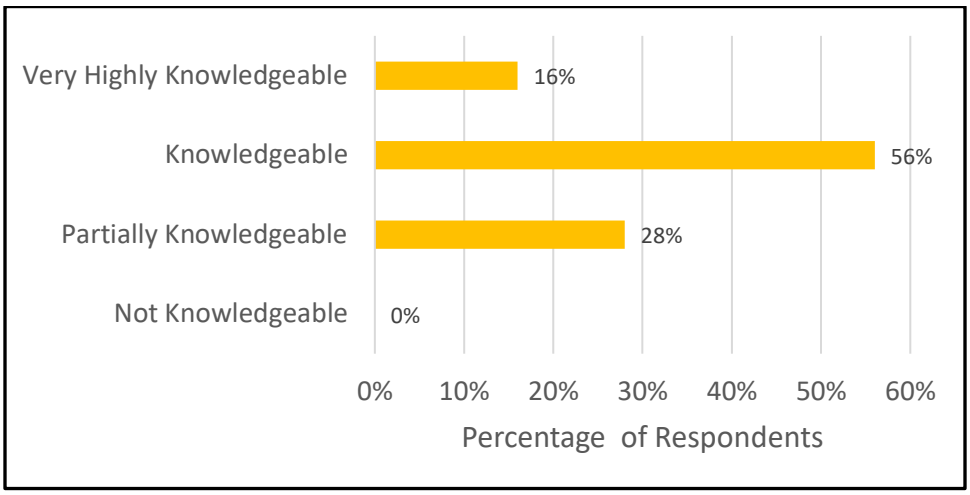
Rank	Barrier	Weighted Average
1	Conflicting interests among the various stakeholders involved in adaptation.	2.77
2	Limited scope and spatial jurisdiction of adaptation-related policies.	2.72
3	Inability of members of the public to make the connection between extreme weather events and climate change.	2.64
4	Lack of relevant, accessible, and understandable climate information among planning agencies to aid in community-level adaptation.	2.64
5	Lack of adequate technical expertise on climate change within planning agencies.	2.64
6	Lack of openness on the part of stakeholders to a range of adaptation options.	2.62
7	Poor communication between climate scientists and policy makers responsible for adaptation.	2.56
8	Poor understanding on the part of planners and policy makers of the non-physical factors which influence vulnerability to climate change.	2.54
9	Lack of knowledge among planners and policy makers on how to address climate change adaptation.	2.13
10	Belief among some members of the public that extreme weather events are divine interventions.	2.03

Eight of the ten lowest ranked barriers have scores which fall into the category of significant barriers, i.e. 2.40 – 3.19. The remaining two barriers have scores which fall into the category of partially significant barriers, i.e. 1.60 – 2.39. The overall pattern emerging from the ranking of the barriers to adaptation in Caribbean SIDS is that the planners surveyed consider the majority of the barriers as very significant or significant. What this quintessentially tells us is that while the ranking of the barriers to adaptation facilitates ease of analysis, this exercise is not a sufficient basis on which to determine priorities for adaptation policy intervention. The relationship among the barriers and dynamics of the local policy environment are important considerations which should guide adaptation planning and policy intervention.

6.3.2 Perception and Awareness of Climate Change

Planners and policy makers, given their pivotal role in adaptation planning, need to be very cognizant of climate change so as to be able to devise effective policy solutions. Figure 6.3 shows how planners and policy makers assessed their level of understanding with regards to climate change.

Figure 6.3 Respondents Level of Understanding of Climate Change



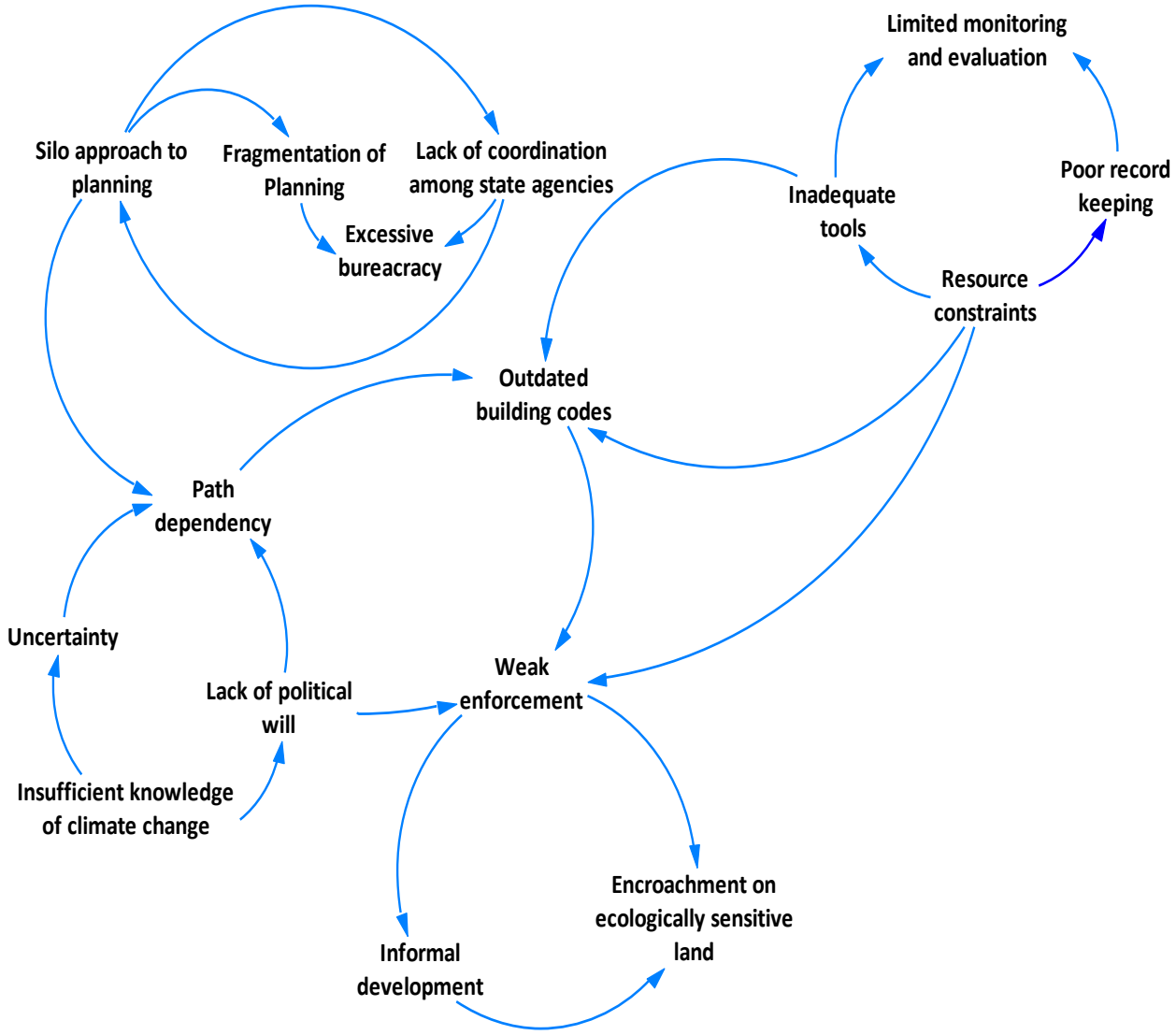
The results show that a combined total of 72% of the planners consider themselves to be either knowledgeable or very highly knowledgeable about climate change. Very highly knowledgeable indicates that the respondent is a climate change policy expert with several years of experience in handling climate change related issues. Knowledgeable indicates that the respondent has a general awareness of the impacts climate change and the associated planning implications. Partially knowledgeable indicates insufficient knowledge of climate change to substantively contribute to policy development. The overall results suggest that general knowledge and awareness of climate change among planners in Caribbean SIDS is not a problem. However, over a quarter of the planners surveyed indicated that they are partially

knowledgeable about climate change and are unable to substantively contribute to the development of climate change policies. Only a relatively small number of planners are highly knowledgeable experts in the field of climate change. However, the survey was unable to capture the extent to which planners and policy makers are aware of the detailed impacts of climate change on specific vulnerable systems, e.g. coral reefs, beaches, and coastal wetlands for which adaptation interventions are needed to reduce vulnerability and enhance resilience. Such detailed knowledge is more likely to reside among members of the scientific community – underscoring the importance of networking and knowledge brokering between scientists and policy makers (Clar et al., 2013; Jones et al., 2009).

6.3.3 Interrelationship among the Barriers to Adaptation in Caribbean SIDS

This section utilizes data from the interviews and content analysis to assess the interrelationship among the barriers to adaptation identified in the survey. In doing so, it further expands on the survey results. Assessing causal linkages between the barriers helps to identify those barriers which are functionally interrelated. As shown in Tables 6.2 and 6.3 which rank the barriers to adaptation in Caribbean SIDS, most of the barriers were scored as significant or very significant. In addition, several of these barriers are inextricably linked with each other, as illustrated in Figure 6.4. For example, there is a strong causal relationship between the "lack of political will", "weak enforcement of planning regulations", "high number of informal and illegal settlements" and "encroachment on ecologically sensitive and hazard-prone lands". The illegal development and occupation of land, including ecologically sensitive lands, is a major problem in many Caribbean SIDS. This problem, though rooted in the colonial legacy of unequal access the land, is also very much an on-going political issue (see Pugh, 2007; Wyatt, 2011; Williams, 2003).

Figure 6.4 Linkages Between the Barriers to Adaptation in Caribbean SIDS



Local politicians are often dependent on informal communities to secure the necessary votes to be elected to office, and so may feel obliged to make overtures to these communities. Strict enforcement of planning regulations carries with it the risk of serious political fallout. This is because any perceived insensitivity on the part of the state to the plight of the poor within informal communities is most likely to be exploited for maximum benefit and political mileage. One of the planners surveyed commented that:

> One of the main issues that comes out is the sustainability of power. The politician would say: Why would I want to remove 10,000 people from a vulnerable area to another area, which might fall within a different constituency. So, the politics of decision making plays an important role (Respondent # 41, e-survey, June 2017).

This helps to explain why there is a causal relationship between encroachment on ecologically sensitive and hazard-prone lands, the lack of political will, and weak enforcement of planning regulations. It also shows how the lack of political will as an actor-centred barrier to adaptation is connected to a systems-related barrier, i.e. encroachment on ecologically sensitive land.

Interviews conducted with senior policy makers from several Caribbean SIDS pointed to a strong connection between the "lack of communication and coordination among the agencies responsible for planning and implementing adaptation actions", "institutional fragmentation, i.e. unclear and overlapping mandates" and the "failure to integrate adaptation projects into on-going local planning and development". Institutional fragmentation and the poor communication and coordination between government agencies have in some cases led to competition for donor funding among various government agencies, because more than one agency has the authority to engage donors. Consequently, adaptation efforts are sometimes unnecessarily duplicated.

Commenting on the need to better streamline adaptation activities, a senior policy maker pointed out that "Different ministries and agencies are doing their own thing. Some ministries have access to overseas funding and so undertake their own projects without sufficient consideration for the wider adaptation picture" (Interviewee 21, personal communication, September 2017). This lack of consideration for the 'wider adaptation picture' is reflected in an ad hoc approach to adaptation projects in several Caribbean SIDS. A combined total of 87.5% of

the planners surveyed strongly agree or agree with the assertion that adaptation projects are fragmented and need to be better integrated into long-term strategic vision plans (see Figure 5.12).

Content analysis of national climate change policies from Caribbean SIDS indicates that legislative reform, along with institutional and organizational strengthening, are key thematic areas of climate policy which are intended to help address the fragmented approach to adaptation planning in Caribbean SIDS. Content analysis results in Figure 5.5 show that from a total of 1057 adaptation actions spread across sixteen thematic areas, 161 actions or 15.2% of all adaptation actions identified were related to legislative reform and institutional strengthening. However, actions outlined in policy are mere statements of intent and cannot necessarily be used as an accurate measure of planning practice.

The reality in Caribbean SIDS is that legislative and institutional reform has been painstakingly slow in effecting transformational change. A case in point is the island of Dominica where comprehensive environmental legislation addressing climate change, the environment, and natural resource management was brought to parliament in 2012. However, to date, the proposed legislation is still awaiting parliamentary approval. Regarding the protracted delay, a senior policy maker posits that "Cross-cutting, integrated and comprehensive environmental legislation is something new for many lawmakers who may feel overwhelmed when such legislation is brought to parliament for approval" (Interviewee 19, personal communication, September 2017). This suggests that technocrats may need to better sensitize lawmakers to make them more au fait with the scope of issues and complexity involved in climate change planning.

Current development challenges often overshadow long-term climate change adaptation in Caribbean SIDS where economic growth and poverty alleviation dominate the planning agenda. As aptly stated by a national policy maker, "Poverty is one of the greatest barriers to adaptation. For you to really adapt as simple as it might look, it takes a lot of money and time, and we have a race between economic growth and poverty" (Interviewee 6, personal communication, August 2017).

In addition to short-term development overshadowing long-term adaptation, insufficient knowledge and awareness of climate change and the need for adaptation on the part of political leaders and members of the public is also considered as a contributory factor to the neglect of adaptation on the planning agenda in Caribbean SIDS. The prevailing consensus among several of the policy makers interviewed is that if political leaders and members of the public understood more about the seriousness of climate change, the issue would receive greater attention on the planning agenda in Caribbean SIDS. This brings into focus the need create greater awareness of climate change. A senior policy maker noted that

> A major barrier is that a lot of people are still wrapping their heads around the notion of climate change adaptation and the importance of that being a priority for a country. So that in the face of scarce resources, and those kinds of things, people are more interested in dealing with day to day bread and butter issues rather than talking about climate change adaptation which might sound a bit esoteric for persons who are not in our kind of discipline (Interviewee 10, personal communication, August 2017).

Content analysis of national climate change policies from Caribbean SIDS identified sensitization and awareness of climate change as a major thematic issue which warrants urgent

and significant attention. Sensitization and awareness was the thematic area with the second highest number of targeted adaptation interventions, with 105 adaptation actions or approximately 10% of the total number of adaptation actions according to thematic areas (see Figure 5.5). This sensitization and awareness target all segments of society, and not only members of the public. It also involves planners, policy makers, the private sector, and elected officials.

6.4 Barriers and Policy Processes

Barriers to adaptation can be matched with different phases of the planning process (see Clar et al., 2013; Ekstrom & Moser, 2014; Moser & Ekstrom, 2010). Aligning the barriers to adaptation with the phases in the adaptation planning process is intended to help policy makers accelerate adaptation by pre-empting the barriers which are likely to arise and take the necessary measures to ameliorate their adverse effects. The precise sequencing and the number of stages in the adaptation planning process often vary, depending on the local policy context, but the general process typically reflects the underlying elements of the rational planning model, albeit with varying degrees of modifications (see Clar et al., 2013; Moser & Ekstrom, 2010; Willows & Connell, 2003). This analysis adopts a generalized rational oriented approach to adaptation planning involving the following four stages outlined by Clar et al., (2013), initially inspired by Moser & Ekstrom (2010).

1. **Agenda Setting** – Identifying and prioritizing issues which require policy intervention. Policy agendas are shaped by public discourses, the nature of the problems being addressed, availability of resources, the values and interests of stakeholders, as well as the power relations among state and non-state actors (Howelett & Ramesh, 2003).

2. **Policy Formulation** – Designing adequate policies to address problems which are on the policy/political agenda. The viability of policy options is dependent on their anticipated costs and benefits, including political costs and benefits. It is also dependent on the balance of power between the primary target groups, at which the policy is aimed, and decision makers.
3. **Policy Implementation** – Operationalizing policies which have been adopted. This is where political intent meets administrative practice, often resulting in a gap between intended and actual outcomes.
4. **Monitoring and Evaluation** – The process of gathering feedback, ideally throughout the entire policy process. However, monitoring and evaluation tend to occur as ex-post evaluation at the end of the policy cycle (Preston et al., 2011), notwithstanding that some form of ex-ante evaluation takes place at the beginning of the policy cycle.

Table 6.4 outlines some of the identifiable barriers which are prevalent in the different stages of adaptation planning, as observed within the context of Caribbean SIDS. The table is based on an analysis of the survey and interview results.

Table 6.4 Barriers within the Different Stages of Adaptation Planning in Caribbean SIDS

Planning Phase	Barriers	Examples
Agenda Setting	▪ Immediate development challenges overshadow long-term adaptation	Economic growth and poverty alleviation dominate the planning agenda
	▪ Conflicting interests among stakeholders	Local residents & environmentalists favouring preservation vs state and private sector interests seeking to develop coastal resources, e.g. wetlands, beaches, etc. Example, Bon Accord lagoon - Tobago, and Goat Island, Jamaica
	▪ Lack of relevant information to aid local adaptation	Absence of community-level climate vulnerability and capacity assessments
	▪ No explicit mandate for local adaptation planning	No legal requirements or guidelines for adaptation planning
Policy Formulation	▪ Poor understanding among planners of the non-physical aspects of climate change vulnerability	Bias towards hard adaptation measures to address climate change
	▪ Inadequate expertise on climate change within planning agencies	Reliance on external technical assistance for policy development
	▪ Inadequate tools for local adaptation planning	Limited use of GIS, visualizations, and climate risk screening tools to support decision making
	▪ Short-term planning versus long-term climate change impacts	Focus on immediate development needs. Heavy alignment of planning with 5-year election cycles

Planning Phase	Barriers	Examples
Policy Implementation	▪ Out-dated planning standards & regulations	Failure to update legislation, plans & policies in a timely manner
	▪ Weak enforcement of planning regulations	High number of informal and illegal settlements
	▪ Failure to integrate internationally funded adaptation projects into on-going local planning and development	Inability to sustain & replicate adaptation projects once donor funding ends
	▪ Limited scope and spatial jurisdiction of adaptation policies	Spatial jurisdiction of the Planning Act in several Caribbean SIDS is limited to the high-water mark in coastal communities
	▪ Lack openness to varied adaptation options	Political preference for hard adaptation measures due to their pronounced visibility
Monitoring & Evaluation	▪ Poor record keeping & data management by government agencies to support adaptation planning	Ad hoc non-standardized environmental reporting by planning agencies
	▪ Inadequate emphasis and resources for monitoring & evaluation of planning policy	Failure to undertake a mandatory review of statutory plans in a timely manner

In addition to the barriers identified in Table 6.4, several cross-cutting barriers which affect multiples stages of adaptation planning were also identified. These include the lack of political will, resource constraint, and fragmented institutional and governance arrangements.

Political will is influenced by popular interest among the masses. Politicians are more preoccupied with issues that they perceive to be directly related to the immediate economic and social well-being of their constituents, rather than long-term climate change. This helps to explain the high priority given to economic growth, job creation, and poverty alleviation on the policy and planning agenda of Caribbean SIDS, compared to climate change adaptation and

mitigation. In cases where there are pre-existing policies and regulations to address climate change, several of the policy makers interviewed opined that the political will needed to ensure implementation, and subsequent monitoring and evaluation is very weak.

Resource constraint is also a major cross-cutting barrier. The availability of adequate financial, technical and human resources is essential to the entire adaptation planning process but is most pronounced during the implementation stage. Access to international grants, loans, and donor funding have enabled Caribbean SIDS to source the requisite technical and human resources needed for policy development. However, limited resources stymie the implementation process. Furthermore, even when implementation does not require substantial capital, it is only undertaken if it is deemed to be politically expedient.

Fragmented institutional and governance arrangements also featured as a barrier impacting the entire adaptation planning process. The roles and responsibilities of various government agencies and non-state actors involved in adaptation planning are not always sufficiently clear and effectively streamlined. The organization of planning into silos, coupled with the absence of effective mechanisms for multi-sectoral coordination, makes collaboration among government agencies challenging during the various stages of the adaptation planning process.

6.5 Diagnosing the Barriers to Adaptation in Caribbean SIDS

This section applies Moser and Ekstrom (2010) diagnostic framework to assess the identifiable barriers to adaptation in Caribbean SIDS. The aim of this assessment is to help identify possible points of intervention to overcome or work through the various barriers to adaptation planning. It is important to note that locating the source or origin of the barriers to

adaptation, relative to the power and influence which policy makers possess is essential to identifying leverage points for addressing such barriers. The diagnostic framework looks at how the temporal and spatial/jurisdictional dimensions of the barriers to adaptation intersect with each other. From this intersection, four categories of barriers are identified based on their origins and how they manifest themselves within any given policy context. The categories are contemporary, legacy, proximate, and remote barriers. This categorization is by no means discrete. At a minimum, the barriers to adaptation usually manifest themselves as a combination of any two of these categories.

The major barriers to adaptation in Caribbean SIDS identified from the survey among planners and interviews with senior policy makers were classified using Moser and Ekstrom's (2010) diagnostic framework. The results are outlined in Figure 6.5. Most of the barriers identified are a combination of contemporary and proximate barriers, as well as contemporary and remote barriers. Legacy barriers also feature strongly in Caribbean SIDS. However, remote barriers which are a legacy of past actions do not appear to be very widespread in Caribbean SIDS.

Figure 6.5 Diagnostic Assessment of the Barriers to Adaptation in Caribbean SIDS

		Temporal	
		Contemporary	**Legacy**
Spatial / Jurisdictional	**Proximate**	Short term issues, planning, and project cycles overshadow long-term adaptation Out-dated building codes, planning, and environmental legislation Poor communication between climate scientist and policy makers Insufficient public understanding of climate change and the urgent need to adapt Weak enforcement of existing planning regulations. Lack of communication and coordination among the agencies responsible for adaptation planning Conflicting interests among stakeholders involved in adaptation planning Failure to integrate donor-funded adaptation projects into on-going local planning and development. Lack of relevant tools and information among planning agencies to facilitate community-level adaptation	Entrenched methods and practices of planning which are unsuitable to address climate change adaptation Encroachment on ecologically sensitive and hazard-prone lands Fragmentation of planning into silos High number of informal and illegal settlements Absence of a clearly defined planning process for local communities
	Remote	Structural economic reforms and the imposition of austerity measures Fluctuations in donor funding for adaptation and mitigation Lack of leadership and political will Inability of vulnerable households to afford insurance coverage No established budget to undertake community-level adaptation planning Poor record keeping by local and central government agencies of data that could support adaptation planning	Unequal access to land and land resources Over-reliance on climate-sensitive resources to support local livelihoods and economic development Poorly developed and diversified economy

Source: Inspired by Moser & Ekstrom (2010)

6.5.1 Contemporary Barriers

A contemporary barrier is one which is current and occurs now. Decision makers may or may not have control over contemporary barriers, depending on whether or not the contemporary barrier also falls into the category of a proximate or remote barrier. Several contemporary barriers were identified in the survey and interviews conducted. Conflicting temporal scales, more specifically short-term development issues overshadowing long-term adaptation planning, is a major contemporary barrier to adaptation. There are notable differences between short-term planning and project cycles and long-term climate change projections and impacts. Planners surveyed ranked this among the top ten barriers to adaptation as indicated in Table 6.2. Several policy makers interviewed pointed to the dominance of issues such as poverty alleviation, job creation, and economic growth on the planning agenda within Caribbean SIDS, compared to climate change adaptation which is perceived to somewhat esoteric (Interviewee 5, 7, 8, 9 and 10, personal communication, August 2017). This dominance is reflected in the medium-term socio-economic policy frameworks of various Caribbean SIDS which define the immediate priority issues for national governments.

Other contemporary barriers which were also ranked among the top ten barriers to adaptation in Caribbean SIDS include the lack of financial resources to undertake community level adaptation planning, and weak enforcement of existing planning regulations. Resource constraints will always manifest itself as a ‘here’ and ‘now’ issue in adaptation planning. However, inadequate technical, financial, and human resources for adaptation planning can also be a remote or legacy barrier over which policy makers have very little if any control. Weak enforcement of planning regulations is attributable to a combination of factors such as limited resources, the lack of political will. In this regard, weak enforcement though manifested as a

contemporary barrier is to some extent a remote barrier as planners and policy makers have very little control over some of the factors which give rise to weak enforcement.

6.5.2 Remote Barriers

Remote barriers are actions which take place within other policy domains outside of climate change, and by actors who are far removed from the local policy context. Nonetheless, these actions constrain local adaptation since climate change cuts across and connect multiple sectors. Among the major remote barriers to adaptation planning in Caribbean SIDS is structural economic reform which often results in the imposition of austerity measures, characterized by a reduction in public spending. This translates into budget cuts and fewer resources for government agencies involved in adaptation planning and the provision of urban services. For example, amidst calls from local environmentalists in Jamaica for the government to increase the resources available to the National Environment and Planning Agency (NEPA) to respond to environmental crises, the Ministry of Finance and Planning has reduced the sum allocated to NEPA for the 2017 – 2018 financial year from $ 838.4 to 812.5 million (Jamaica Gleaner, February 16, 2017). This barrier was not captured in the survey but was mentioned by some of the policy makers interviewed.

Leadership, including the lack of political will manifested itself as both a remote and contemporary barrier to adaptation in Caribbean SIDS. As shown in Table 6.2, the lack of political will was the second highest ranked barrier to adaptation by the planners surveyed, and is also deemed to be a very significant barrier. The lack of political will was identified as an issue over which policy makers have very little control – hence a remote barrier. Policy makers interviewed noted that they are effectively powerless to implement and enforce planning

regulations which enable adaptation without the support of the local political directorate. For example, the proliferation of illegal settlements, and encroachment on ecologically sensitive and hazard prone lands are major barriers to adaptation in Caribbean SIDS. However, policy makers bemoaned the lack of political support to enforce planning regulations to curb this problem. A senior policy highlighted the following.

> The issue of squatting and illegal occupation of government land is something that the planning legislation does not allow. However, in some cases the government has regularized squatters by asking them to pay as little as $ 1.00 per square foot for the land they illegally occupy because it is a kind of political expedient thing to do. Applying the law would have meant evicting the people from the land. Now evicting people from the land is not a politically successful thing to do when you are depending on those people for votes (Interviewee 19, personal communication, September 2017).

Planners interviewed and surveyed also noted that leadership is not limited to those who hold political office. Leadership also includes community leaders and champions who advocate and lobby for local policies and projects to support adaptation and mitigation. In the context of Caribbean SIDS where formal local government is weak, and in some cases non-existent, community leaders are important in helping to advance local climate change adaptation.

Remote barriers cannot be directly addressed by local policy makers. Faced with remote barriers, they are required to work around these barriers, rather than try to directly solve them all together. For example, in the face of less financing for adaptation, streamlining adaptation efforts to eliminate unnecessary duplication by different government ministries is one possible way to help circumvent a shortage of financing. Likewise, policy entrepreneurs through their networks

and connections can mobilize resources for adaptation initiatives where state resources fall short or is unavailable. This can be done by forging a private-public partnership to tap into the resources and expertise of the private sector. (see Bauer & Steurer, 2014).

6.5.3 Legacy Barriers

Legacy barriers are past policy decisions, the effect of which negatively impact current adaptation decision-making. Those past policy decisions may be made by actors both within and outside of the local policy environment. When legacy barriers originate with actors outside of the local policy environment, they also become remote barriers and local officials cannot easily overcome such barriers by addressing them at their source.

Path dependency otherwise described as entrenched planning practices which are unsuitable to address climate change adaptation is one of the most common forms of legacy barriers. In the absence of strong local government systems, spatial development planning in Caribbean SIDS is highly centralized. Traditionally, there is a strong reliance on centralized planning frameworks within Caribbean SIDS which does not allow for sufficient public participation in crafting and implementing policies which shape local community development (see Pugh, 2013). This makes it difficult to institutionalize and build local capacity for adaptation, as local management and governance structures are very weak. Existing policies and plans specifically designed to address climate change (see Table 3.3) primarily focus on the national level or on a given sector. Hence most of the capacity that is being built to address climate change within the Caribbean is taking place at the national level, as opposed to the community level where the effects of climate change are felt the greatest.

The fragmentation of planning into silos is also legacy of the way in which planning has been traditionally organized. Planners surveyed ranked institutional fragmentation characterized by unclear and overlapping mandates as the tenth leading barrier to adaptation in Caribbean SIDS (see Table 6.2). This fragmentation results in an ad hoc approach to adaptation planning, particularly the execution of local adaptation projects as indicated in Figure 5.12. Planners interviewed noted that while there has been increased coordination among government agencies involved in adaptation planning, there is still considerable room for improvement in streamlining adaptation planning activities.

It is difficult for local policy makers to reverse the impact of legacy barriers on adaptation planning due to path-dependent behavior. Meaningful planning reform aimed at reorganizing the institutional and governance arrangements within Caribbean SIDS lies at the heart of correcting much of the legacy barriers to adaptation. Changes in cultural practices are also need to reverse legacy barriers. Decision makers at higher levels of planning have the power to create changes which can have a far-reaching positive or negative legacy. However, local decision makers do not have to wait for changes from higher level decision makers to address legacy barriers. Building governance coalitions outside of the confines of the formal planning system, without asking for any political or financial commitment, can be effective in advancing local adaptation in the face of limited support from higher levels of planning. Such coalitions should involve forming formal partnerships as well as informal networking and relationship building.

6.5.4 Proximate Barriers

A barrier that is proximate is one over which decision makers have direct control, and which they can address within the remit of their power. Among the proximate barriers identified from the survey and interviews were: poor communication between climate scientists and policy makers, insufficient public understanding of climate change and the urgent need to adapt, lack of relevant tools and information among planning agencies to facilitate community-level adaptation, failure to integrate donor-funded adaptation projects into on-going local planning and development, out-dated building codes and environmental legislation, lack of knowledge among policy makers on how to address climate change, and insufficient public support for adaptation. Several of the planners interviewed argued that proximate barriers such as those outlined above can be a starting point for addressing the barriers to adaptation, given that policy makers have more power at their disposal to tackle these issues.

6.6 Summary and Conclusion

Most of the identifiable barriers to adaptation in Caribbean SIDS are rooted in ineffective institutional and governance arrangements for adaptation decision making. In seeking to prioritize the barriers to adaptation, weighting or ranking the barriers revealed very little difference in scores. Most of the barriers were deemed to be significant or very significant, suggesting that they are accorded similar priority by planners and policy makers. Understanding the interrelationships and causal linkages between the barriers to adaptation in Caribbean SIDS is essential to addressing the barriers as manifested within the different stages of the adaptation planning process. This underlying principle also holds true in the frameworks used to assess the

barriers to adaptation, such as Moser and Ekstrom (2010) diagnostic framework for assessing the barriers to adaptation.

Having presented the barriers to adaptation in Caribbean SIDS, the next chapter discusses how the barriers to adaptation are manifested within the context of the spatial development planning framework which exists in Caribbean SID. It juxtaposes the findings presented in this chapter with those presented in chapter five to discuss the relationship between spatial development planning and the barriers to adaptation in Caribbean SIDS. In so doing it triangulate the research findings and addressed all three research objectives.

Chapter Seven
Discussion

7.1 Introduction

This chapter provides a detail discussion of the research findings presented in chapters five and six. The discussion is guided by the research objectives outlined in chapter one. In contextualizing this discussion, the arguments presented in this chapter are framed against the backdrop of the institutional and governance architecture for adaptation planning in Caribbean SIDS outlined in section 3.6. To strengthen the external validity of this research, the research findings are also discussed in relation to key themes from the adaptation planning literature on SIDS, as well as the barriers to adaptation.

The chapter begins by exploring key trends and issues in adaptation planning in Caribbean SIDS, as manifested at the regional, national, and local levels. In doing so, reference is made to the regional, national, and local planning frameworks which facilitate adaptation in Caribbean SIDS. The chapter then discusses various examples of the barriers to adaptation in Caribbean SIDS. Seven categories of barriers are discussed based on a classification of the barriers to adaptation derived from the literature, as well as the research findings. The chapter then proceeds to expound on the linkages between the barriers to adaptation and the different stages of the planning process. The rational planning model is used to conceptually represent the adaptation planning process, which is schematically juxtaposed with the barriers to adaptation to illustrate the linkages between the barriers to adaptation and the planning process. The chapter then shifts attention to addressing the barriers to adaptation. A set of guiding principles are outlined which are intended to serve as a heuristic for addressing the barriers to adaptation in Caribbean SIDS. Opportunities for mainstreaming adaptation in Caribbean SIDS are briefly

explored. The chapter then concludes with a synopsis of the salient points and key issues from the discussion.

7.2 Trends and Issues in Adaptation Planning Within Caribbean SIDS

7.2.1 Regional and National Level Adaptation Capacity Building

Considerable effort is being made to advance adaptation planning in Caribbean SIDS. However, a collective assessment of the results of the content analysis, survey, and interviews revealed that much of the formal capacity building for adaptation within the Caribbean is taking place at the national level, with limited emphasis being placed on the development of localized planning mechanisms and approaches to address climate change adaptation. As illustrated in section 5.2.3.3**,** content analysis of climate change policies and selected spatial development plans from Caribbean SIDS show that the number of adaptation actions involving national governments far outweighs those of civil society, NGOs, and local communities. Likewise, the survey and interview results presented in sections 5.3 and 5.4 show that greater attention is paid to national level adaptation planning compared to local adaptation.

The failure to effectively undertake local adaptation planning in Caribbean SIDS can be largely attributed to the dependence on centralized managerial planning frameworks for developing and implementing adaptation policies. As outlined in section 3.6.3, formal local government is weak, underdeveloped, and in some cases non-existent in Caribbean SIDS. It can be argued that the size, population, and resource base of most Caribbean SIDS makes having a full-fledged system of local government difficult, if not impractical (Potter, 2002; Schoburgh, 2012). As opposed to having a clearly defined and structured multi-level planning system, planning in Caribbean SIDS is undertaken along a continuum with centralized and localized

planning activities at opposite ends of the spectrum. Given this reality, planning agencies and policy makers simultaneously operate at both the national and local levels in terms of how they go about developing and implementing planning policy, inclusive of climate change adaptation and mitigation.

In the absence of well-established systems of local government in Caribbean SIDS, local communities are potentially at risk of being marginalized in the adaptation planning process. This is because their unique vulnerabilities and adaptation needs are likely to take second place to overriding national adaptation priorities. Increased community involvement in adaptation planning is a key imperative for Caribbean SIDS to ensure that those who are most at risk are actively involved in developing and implementing adaptation strategies. One of the planners who participated in the survey shared the following opinion.

> Climate sensitization at the local community level is important, but it's a challenge given the poor capacity of local government agencies and the lack of organized community groups. In this context, it is difficult to find climate change 'leaders' who can champion the case for community adaptation and raise awareness levels (Respondent #28, e-survey, June 2017).

Because of the limited local planning capacity in Caribbean SIDS, it is unlikely that models of decentralized planning from large developed countries can be successfully replicated in Caribbean SIDS. Essentially, the current planning arrangements in Caribbean SIDS do not sufficiently facilitate or reflect the decentralized and bottom-up forms of planning espoused in contemporary planning theory.

Attempts within Caribbean SIDS to develop local planning capacity to address climate change predominantly focuses on disaster risk management activities. In comparison to climate change adaptation, there is a greater level of institutional support, experience and expertise in the field of disaster risk management within Caribbean SIDS – though distinguishing between the two is not always clear in practice. Survey results, as well as interviews with senior policy makers from across the Caribbean, revealed that disaster risk management in terms of the protection of life and property during extreme weather events, dominates the immediate focus on climate change. Within each CARICOM member state, there is a national agency that is tasked with managing the response to physical disasters. Where there is a system of local government in place, this done in partnership with local municipalities, as well as various Community Based Organizations (CBOs), grass root organizations and networks.

At a Caribbean wide level, CARICOM has established the Caribbean Community Climate Change Centre (CCCCC) to lend technical support to national governments and coordinate the region's response to climate change. In addition to developing a Regional Framework and Implementation Plan to guide climate change adaptation and mitigation within CARICOM member states, the CCCCC has also created an online risk screening tool called CCORAL to help developers and investors screen their projects for climate risks. However, the Regional Framework has been criticized for placing little emphasis on the development of localized community-based mechanisms address climate change adaptation (Bishop & Payne, 2012; Mercer et al., 2012). Commenting on the Regional Framework, Mercer et al., (2012, p. 1912) contend that:

> Regional initiatives to date have focused on capacity building, preparation of national climate change policies, provision of technical assistance, climate information and

> monitoring, assessments and research, education and communication, and policy formation. These initiatives have made essential contributions to government capacity building, although this is currently not translating into [sufficient] on the ground action integrating local and external expertise.

In discussing the localization of adaptation planning in Caribbean SIDS, it is important to consider whether or not a practical distinction can be made between a community-oriented adaptation planning process versus a community-driven adaptation planning process. The former suggests that even in the absence of entrenched formal local government structures, adaptation can still take on a considerable community focus, provided that policy makers consult with locals and internalize adaptation from a local perspective. The latter connotes the widely held view that local communities cannot take centre place in adaptation planning unless decision-making powers are devolved to established local entities. A fulsome debate of this moot is beyond the scope of this research. However, the proposition of a community-oriented adaptation process could possibly provide insights that are applicable to the Caribbean SIDS context in light of the very limited local planning capacity which exist in SIDS.

7.2.2 Adaptation as an Established Policy Domain

Attempts are being made within Caribbean SIDS to make climate change adaptation an established policy domain, as opposed to limiting adaptation to conventional mainstreaming whereby adaptation measures are incorporated into pre-existing sectoral plans and policies. Evidence of this is emerging at the national level where adaptation planning is increasingly assuming a niche of its own. This can be seen in the creation of national climate change policy frameworks, facilitated by international donor funding, along with the establishment of

specialized government departments and ministries which focus exclusively on climate change issues. As illustrated in Table 3.3 and section 5.3.1, these developments suggest that a national climate change agenda is evolving with clear policy objectives. It can be argued that this represents the beginning of a comprehensive approach and direct commitment to adaptation planning, rather than solely relying on sectoral provisions to advance adaptation.

The growing focus on climate change adaptation as a policy niche emerged partly in response to the need to better streamline adaptation and mitigation in Caribbean SIDS. The fragmented approach to adaptation planning in Caribbean SIDS characterized by a lack of communication and coordination among state agencies involved in adaptation, duplication of adaptation initiatives, and the failure to integrate adaptation initiatives into strategic action plans has served as a catalyst for streamlining adaptation planning. Initially, adaptation planning within Caribbean SIDS started out as an ad hoc assemblage of projects lacking a coherent policy focus. Although a project-centred approach still exemplifies local adaptation planning in Caribbean SIDS (see section 5.4.1), the creation of national-level adaptation planning policy instruments is giving clarity and direction to the adaptation planning process.

The attempts being made in Caribbean SIDS to make climate change adaptation an established policy domain are not meant to replace the conventional mainstreaming process, but rather complement it. National climate change policy frameworks are intended to guide the mainstreaming of adaptation into sectoral plans and policies, with particular emphasis on climate-sensitive sectors such as tourism, infrastructure, housing, agriculture, and fisheries. They can be viewed as part of a wider effort to help overcome the institutional and governance constraints to adaptation in Caribbean SIDS.

Although adaptation is evolving into an established policy domain, there is no explicit legal requirement in any Caribbean SIDS to undertake adaptation planning. Even in the lone case of the British Virgin Islands (BVI) where there is a Climate Change Act, it speaks to streamlining funding for local climate change projects, as opposed to climate change planning. Presently, provisions for climate change adaptation and mitigation are subsumed within existing planning and environmental regulations which are inadequately enforced. It is of interest to note that the planners surveyed ranked the lack of an explicit mandate for planning agencies to undertake local adaptation as a significant barrier to adaptation. However, the consensus emanating from subsequent interviews with senior policy makers (drawn from among the survey respondents) was that although the absence of a mandate to undertake local adaptation planning is a barrier to adaptation, the current focus should be on enforcing existing planning and environmental regulations. Policy makers contend that creating climate change specific planning legislation would further crowd and complicate the planning system. Essentially, most policy makers are of the view that existing planning regulations have not been sufficiently enforced or tested to aptly determine their effectiveness and the need for new legislation mandating climate change planning. This position is counter to the emerging trend in planning practice, particularly in the developed world, whereby climate change specific legislation is being promulgated as part of the effort to institutionalize and strengthen climate change planning as an established policy domain (see Ford et al., 2011; Preston et al., 2011; Tang et al., 2010; Wheeler, 2008).

7.2.3 Policy Saturation but Implementation Deficit

National level adaptation policies to support adaptation are fairly developed in most Caribbean SIDS. As signatories to the UNFCCC, Caribbean SIDS have been able to access international donor funding from the Global Environmental Facility (GEF), Adaptation Fund,

and the Green Climate Fund, among other sources to assist in their adaptation efforts. Much of this funding is targeted at creating adaptation and mitigation related policies to support sustainable national and local development. Consequently, Caribbean SIDS have been able to develop a suite of climate change related policies as an output from various internationally funded climate change projects (see Table 3.3 & Section 5.3.1). In this regard, considerable progress has been made in addressing much of the policy void related to climate change which initially existed in various Caribbean SIDS. Some Caribbean SIDS such as Jamaica can be described as 'policied out' in that the requisite adaptation and mitigation policies are basically in place[5]. It is largely now an issue of downscaling and implementing the existing policies – herein lies the challenge. However, it is also important to note that in some cases the lack of human and institutional capacity to meet the management and reporting requirements of donor agencies has made it challenging for some Caribbean SIDS to access time-bound project funding that is available such as the Green Climate Fund and Adaptation Fund (Scobie, 2016). It is, therefore, not surprising that institutional and organizational strengthening is that among the thematic areas which are being targeted for intervention in national climate change policies within Caribbean SIDS. This is revealed in the content analysis results shown in Figure 5.5.

Implementation of adaptation policies can be a very costly undertaking depending on the type of adaptation measures being implemented and the scale at which adaptation is being carried out. Policy makers interviewed were keen to point out that the scale at which implementation is being undertaken will determine whether local financing is sufficient. Not all adaptation measures require massive external capital injection, e.g. creating awareness that leads to behavioural change such as voluntary compliance with planning and environmental

[5] Information gleaned from interviews with policy makers in Jamaica.

regulations. Micro-scale individual household level adaptation e.g. personal rainwater harvesting can be self-financing in that it translates into increased financial savings for households in the long term. It also has the added advantage of making households less dependent on centralized infrastructure and urban services which as Dhar & Khirfan (2016) point out are prone to system-wide failure during extreme weather events.

Several policy makers interviewed noted that Caribbean SIDS lacked the financial and technical capacity to handle big adaptation challenges such as redesigning and upgrading public infrastructure to make them more resilient in the face of extreme weather events. They pointed out that the resources generated internally are simply insufficient to address these issues. Several Caribbean SIDS have moved into the category of middle-income countries where their per capita GDP makes them ineligible to receive certain development aid and grants. This, however, does not mean that Caribbean governments have the requisite financial resources needed for adaptation. Consequently, Caribbean SIDS still have to rely on external loans to get the capital injection needed to effect large-scale adaptation. This challenge is aptly summarised in the following words by a senior policy maker.

> Building the requisite infrastructure to protect the coast is a very costly undertaking usually funded by external loans which must be paid back. In addition, they (*the infrastructure*) also have to be maintained over the long term. The provision of such infrastructure must, therefore, be treated as an investment capable of paying back for itself (Interviewee 14, personal communication, August 2017).

In other words, there should be clear linkages between the financing of adaptation projects and local economic development to ensure that monies expended to safeguard against the impacts of

climate change not only protect the physical environment but also protect existing and future investments in the economy. This is necessary to shift the narrative on adaptation financing in Caribbean SIDS from a preoccupation with expenditure requirements to a focus on investment opportunities capable of not only paying for themselves in the long term but also generating revenue.

7.2.4 Strategic Marginalization of Spatial Planning

Caribbean SIDS have long-term national vision plans which lie at the heart of their policy framework for sustainable development. However, as described in sections 3.6.2 and 5.3.1, it is the use of medium-term socio-economic policy frameworks spanning 3 – 5 years which serve as the principal operational policy mechanism for guiding development. Medium-term socio-economic policy frameworks are usually developed by the ministry responsible for economic planning and development. Unlike long-term vision plans which span multiple election cycles, medium-term socio-economic policy frameworks are usually aligned to fit the national election cycle. Because planning is not only a managerial exercise but also a highly political activity (Beisbroek et al., 2014; Rakodi, 2001), this gives political administrations the opportunity to develop and leverage the medium-term socio-economic framework both as a managerial tool and a political instrument.

From a normative perspective, long-term vision plans are supposed to inform sectoral and other lower-level plans which combine to create a series of interlocking nested plans. However, within the context of Caribbean SIDS strategic decision-making power resides with the cabinet (Dodman, 2008; Pugh, 2006). This creates a planning culture whereby the medium-term socio-economic framework signed off by the cabinet, as well as other high-level cabinet and

ministerial decisions, effectively dictate the strategic focus of spatial planning agencies. What this means in practice is that by the time planners within the formal statutory planning system get involved in the planning process, strategic development policies would have already been framed and set in motion – creating a predefined pathway to development which can serve to either enhance or constrain climate adaptation. At the point at which spatial planning agencies get involved in the development approval process mentioned in section 5.4.2, the underlying nature of major development projects would have already been pre-determined. The job of the spatial planning agencies then becomes a matter of how best to align the types of developments which the medium-term socio-economic framework encourages with existing planning regulations. This is irrespective of whether or not such developments are conducive or inimical to climate change adaptation, to begin with. Consequently, there is the perception that planning is a 'rubber stamping' exercise, rather than serious analysis and decision-making to curtail poor development choices (Pugh, 2013).

The role and function of national spatial development planning agencies within the Caribbean is still viewed largely in terms of conventional land use or physical planning, i.e. regulating the form and location of built development in keeping with zoning plans and policies. To a large extent, the underlying strategic policies which guide development and influence the spatial distribution of economic, social, and environmental activities do not directly emanate from within the spatial planning agencies themselves. Thus, it can be argued that at the highest level, strategic development planning resides outside of the power of the spatial planning agencies within Caribbean SIDS. As highlighted in section 5.3.2, the role of national spatial planning agencies tends to be more in keeping with regulatory or development control functions, and less about strategic decision-making. When it comes to strategic decision-making, planners

can only act in an advisory capacity to the political directorate (i.e. cabinet) where the ultimate decision-makers reside. This places planners on the periphery in terms of the power and influence that they can exercise in strategic decision-making for climate change adaptation.

Content analysis of national climate change policies and spatial development plans from various Caribbean SIDS indicates a range of adaptation and mitigation measures spread across multiple sectors and thematic areas (see Figure 5.4 & 5.5). This begs the question of the extent to which adaptation and mitigation measures are translated into the medium-term socio-economic frameworks of respective Caribbean SIDS. A review of medium-term socio-economic frameworks from selected Caribbean SIDS indicates that their primary focus is attaining immediate economic growth to address high levels of poverty and unemployment. This was further corroborated by information gleaned from interviews with senior policy makers who noted that while there has been talk about building a resilient economy, climate change is not sufficiently distilled into the medium-term socio-economic frameworks.

Besides the failure to sufficiently integrate climate change concerns into the medium-term socio-economic frameworks, another as an aspect of the marginalization of spatial planning is relaxing site development standards to appease developers, particularly tourism interests. For example, the setback in the low-lying coastal town of Negril, Jamaica was recently revised in 2015 to allow for development 100 feet from the high-water mark, down from 150 feet, depending on the type of development[6]. This happened despite numerous local studies documenting the adverse effects of sea level rise and beach erosion in Negril (McDougall, 2017; Mondon & Warner, 2012; UNEP, 2010; Robinson et al., 2012). Commenting on the challenge

[6] Negril and Green Island Development Order 2015.

which sometimes arises in trying to balance development and adaptation objectives, a senior policy maker from a leading Caribbean tourism destination stated the following:

> Sometimes you have individuals (developers) that just want what they want.….and actually, some of them have even told us that they have enough money to build back whatever how many times if a hurricane knocks it down. You have those mentalities that have the financial wherewithal to challenge the good you are trying to do, and in challenging they can set a bad example for others to follow (Interviewee 15, personal communication, August 2017).

It appears that once the profit margin for developers is not adversely affected by climate change in the short term, it is a tough sell to get some developers to sacrifice short-term gains for long-term adaptation.

7.2.5 Discontinuity and Politically Driven Decision Making

Changes in political administration sometimes result in the discontinuation of certain policies and projects intended to promote adaptation. Discontinuity in adaptation policies and projects arising from changes in political administration often translates into a loss of the gains made and lessons learnt from adaptation projects. This points to the need to secure political buy-in not only from government but also from the opposition as well. This is necessary to ensure that the Regional Framework for climate change is successfully implemented on a sustained basis within the respective Caribbean SIDS. This is necessary given the dynamic political environment in which adaptation takes place. Key policy makers interviewed expressed the view that stakeholder engagement regarding strategic policy directives on climate change should

include working with both government and opposition. A senior regional climate change policy expert shared the following opinion.

> As I always argue, I would like to see within the Caribbean that we do not treat a government that may have won by 51.1% as though 51.1% is equivalent to 100%. In other words, there has to be a space created for the opposition as well, because the opposition of today can well become the government of tomorrow. So, let us stop thinking only about working with governments and let us think about working with the legislature (Interviewee 1, personal communication, August 2017).

Aspects of the culture of governance within Caribbean SIDS also act as a barrier to adaptation planning. Political expediency often takes precedence over evidence-based policy-making. Furthermore, politicians are naturally reluctant to implement unpopular adaptation and mitigation measures. Policy makers interviewed noted that politics rather than scientific evidence drives actual decision making – though this is gradually changing with increased advocacy from civil society, who are now exerting a stronger influence on issues of national and local governance. A senior regional climate change policy analyst interviewed commented that:

> Within the Caribbean, we are not very good at using information for decision making. Decisions often are made based on the political whims and fancies of the political directorate and we cannot try to 'fudge' that issue. If a constituency, for example, requires a particular road to be built, I am not sure we are looking at the climate change impact of how that road can be built (Interviewee 2, personal communication, August 2017).

While politics plays a part in the planning process, adaptation decision making should be primarily evidence-based to ensure that optimal decisions are made and implemented.

7.2.6 Limited Monitoring and Evaluation

Monitoring and evaluation constitute an important, but an often-overlooked component of the adaptation planning process (Preston et al., 2011, Tang et al., 2010). Climate change adaptation is a complex and dynamic long-term process. Although Caribbean SIDS are in the early stages of the adaptation planning process monitoring and evaluation is vital to assessing progress on an on-going basis. Overall, monitoring and evaluation of climate change - including project, programme, and policy evaluation is very limited. Local adaptation planning in Caribbean SIDS revolves largely around short-term adaptation projects, with very little implementation of long-term programs and policies. Consequently, monitoring and evaluation are mainly confined to project evaluation which is undertaken as a requirement of donor-funded projects. Survey results in section 5.3.2.3 indicate that spatial planning agencies pay very little attention to monitoring and evaluation of climate change adaptation. In some cases, indirect forms of monitoring and evaluation of adaptation exist via environmental assessments reports. At best such reports serve only as a proxy for monitoring and evaluating adaptation.

While limited implementation of adaptation policies, as well as resource constraints were identified as contributory factors to inadequate monitoring and evaluation, indicators for monitoring and evaluating climate change adaptation are either absent or poorly developed in Caribbean SIDS. At the heart of the monitoring and evaluation challenge is how to go about measuring climate change adaptation against a moving baseline which is poorly understood. Barring the mandatory review requirements for statutory national spatial plans, there is no

explicit requirement to undertake plan and policy evaluation as it relates to adaptation planning within Caribbean SIDS. Even then, there is no systematic methodology in place to guide the review process for national spatial plans to ensure analytical rigour and consistency. Because adaptation is highly context-specific, it is difficult to develop a unified conceptual approach and suite of metrics to evaluate progress towards adaptation (Dupuis & Biesbroek, 2013; Preston et al., 2011; Tang et al., 2010). Presently, the indicators that are used to gauge adaptation at the national and local levels in Caribbean SIDS are limited to risk and damage assessment, e.g. loss of lives and the cost of damage associated with extreme weather events. The underlying assumption is that the fewer lives lost and less damage that occurs from extreme weather events, the more adapted is the society. This also reflects the dominance of the disaster risk reduction model in adaptation planning within Caribbean SIDS as described in section 2.6.1 of the literature review. Other more nuanced indicators which focus on the social determinants of exposure and sensitivity, e.g. poverty, poor governance, land use and livelihood practices, which make individuals, households, and communities vulnerable to climate change are not sufficiently taken into consideration. Furthermore, monitoring and evaluation are treated as an afterthought as opposed to an on-going process involving ex-ante, interim, and ex-post evaluation.

At the regional level, there are no explicit set of indicators to directly assess the extent to which the Regional Framework is being successfully implemented. This is not surprising given that methodologies and tools for assessing adaptation are still the formative phases of development. There is a built-in two-year review mechanism within the Regional Framework to ensure that it remains current. This review is dependent on timely feedback and reporting from focal points within CARICOM member states, as well inputs from various committees and organs of CARICOM. The intention is to have on-going dialogue to ensure that the Regional

Framework and Implementation Plan does not become static policy documents. However, the resources, institutional, and technical support needed for effectively monitoring and evaluating the Regional Framework are lacking, as to date, there has been no official review of the Regional Framework since the promulgation of the Implementation plan in 2012.

Any attempt to create a framework for evaluating adaptation planning should be cognizant that the criteria for success are context specific, due to the highly localized nature of vulnerability and climate change adaptation. Participatory approaches to the evaluation of climate policy offer the opportunity to employ scientific tools and methodologies within a localized context which consider the peculiarities of different communities (Debels et al., 2009; Preston et al., 2011). This is particularly important within the context of Caribbean SIDS, which differ considerably despite sharing certain common characteristics.

7.2.7 Over-Reliance on Projects to Drive Adaptation

There is a strong reliance on projects to drive local adaptation within Caribbean SIDS. While this is very helpful in advancing adaptation in the region, projects cannot always be sustained on an ongoing basis due to a lack of funding. It is, therefore, imprudent for Caribbean SIDS to continue to primarily rely on projects to sustain the local adaptation effort (Scobie, 2016). As highlighted in section 5.4.1, there is a need for more permanent self-sustaining mechanisms to drive local adaptation within Caribbean SIDS. The planning approval process as a permanent feature within the local planning system provides one such mechanism. Through the terms and conditions attached to planning approval adaptation measures embedded within various planning and environmental regulations are brought to bear on development at the community level. In this regard, planning approval ideally functions as a bridge which connects

spatial planning and climate change adaption in practical terms. It also tangibly operationalizes adaptation and mitigation related policies. When carried out on a consistent basis, the enforcement of climate change related planning regulations function as a quality assurance mechanism for local adaptation and mitigation planning.

Although an effective planning approval process can help to meaningfully advance local climate change adaptation, there is very limited planning capacity to enforce planning regulations in Caribbean SIDS. For the planning approval process to be effective in lessening the dependence on intermittent projects to drive adaptation, further capacity building is needed within the spatial planning agencies in Caribbean SIDS. There is a high level of informal development in Caribbean SIDS (Besson & Momsen, 2007). Development, including large projects, often takes place without the requisite planning approval. Even those developments with planning approval sometimes breach the terms and conditions of their approval – hence site monitoring is a problem. Policy makers are given serious attention only when there is a disaster which brings to the fore the issue of enforcement and climate change. In those Caribbean SIDS which have a formal system of local government, municipal corporations are responsible for enforcing stipulated planning standards. In smaller Caribbean SIDS without a formal system of local government, this responsibility resides with the central planning authority.

7.3 Manifestations of the Barriers to Adaptation in Caribbean SIDS

7.3.1 Physical Barriers

There are certain physical characteristics which render Caribbean SIDS vulnerable to the impacts of climate change, as well as constrain their ability to adapt. The findings of the survey suggest that physical barriers to adaptation such as informal and illegal settlements, and encroachment on ecologically sensitive and hazard-prone lands are increasingly being

acknowledged in Caribbean SIDS. Urban growth and development in Caribbean SIDS reflect the inequality and unequal access to land resources which exist within Caribbean society, whereby large segments of the population illegally occupy and build structures on marginal hazard-prone lands to take care of their housing needs (Pugh, 2007; Wyatt, 20111; Williams, 2003). This points to the deeper issue of poverty as a determinant of social vulnerability and unsustainable land development in Caribbean SIDS.

In addition to informal development on hazard-prone lands, there is a concentration of settlements within the coastal zone which are at risk from sea level rise and coastal flooding. However, the small size of many islands, coupled with a rugged interior unsuitable for large-scale settlement, effectively negate against coastal retreat as a viable adaptation measure in response to sea level rise and coastal inundation. This leaves Caribbean SIDS with fewer viable long-term adaptation options to deal with sea level rise.

Size as a constraining factor also means that entire islands are severely affected by extreme weather events, as there are no safe havens which can provide temporary reprieve in times of disaster. This reality was laid to bare during the recent passage of hurricane Irma and Maria in September, 2017 which completely devastated several Caribbean islands. The scale and severity of the destruction led to the complete evacuation of the island of Barbuda with its population of approximately 1700 in the aftermath of hurricane Irma (Gibbons, 2017), raising concerns that this could be the beginning of a long-term climate refugee crisis within the Caribbean region.

7.3.2 Resource Constraints

The lack of resources to support adaptation in Caribbean SIDS remains a serious challenge. However, the dynamics of resource availability are changing. International donor funding has provided much-needed resources for adaption policy making. Interviews with senior policy makers from Caribbean SIDS revealed that international donor funding, though highly helpful, are not sufficient to meet the adaptation needs of the Caribbean, particularly as it relates to the implementation of adaptation interventions on a sustained basis. It is in the implementation, and monitoring and evaluation stages of the adaptation planning process that Caribbean SIDS lack the critical resources necessary for adaptation. Consequently, the need for resources has now shifted to addressing the growing implementation deficit which exists in Caribbean SIDS.

The need to be less reliant on external financing for adaptation is leading governments across the region to explore domestic sources of financing for adaptation. Content analysis of national climate change policies from Caribbean SIDS indicates that adaptation financing is a major thematic area of focus (see Figure 5.5). The policies acknowledge the inherent limitations associated with international financing mechanisms for adaptation and mitigation in SIDS and advocate for the imposition of environmental taxes as a means of increasing domestic financing to support adaptation. Unlike external financing over which policy makers in Caribbean SIDS have very limited control, the structure of domestic financing can be regulated by policy makers. As outlined in section 5.2.3.2, domestic initiatives for financing adaptation are being developed within Caribbean SIDS, but admittedly most are in their infancy. For example, the government of Jamaica recently implemented an environmental levy, as well as a carbon tax in an effort to generate revenue for adaptation and promote climate change friendly behaviour. In the multi-

island state of St. Vincent and the Grenadines, the Sustainable Development Unit is seeking to effectively utilize their limited resources by streamlining adaptation and mitigation activities across various government ministries and departments to avoid duplication of efforts.[7]

It can be deduced from the research findings that poverty lies at the heart of much of the resource constraints facing adaptation planning in Caribbean SIDS. The adaptation planning literature also identifies poverty as being among the leading drivers of social vulnerability to climate change (Adger et al., 2009; Adger & Kelly., 1999; Brouwer et al., 2007; Dulal et al., 2009). As demonstrated in section 5.3.1, high levels of poverty in Caribbean SIDS have led to short-term economic growth and development taking precedence over long-term adaptation on the planning agenda. The underlying thinking is that growing the economy will provide the necessary financial resources needed for adaptation. While there is truth in this assertion, the problem is that the development pathways chosen to achieve the desired economic growth and development are in some cases inimical to long-term climate change adaptation and sustainability. In other words, it is inherently contradictory and self-defeating to ignore climate change in the quest to achieve economic growth and development, with the view that the financial gains from added economic growth will be used to address the ills of climate change.

7.3.3 Institutional and Governance Constraints

Institutional and governance related barriers are among the most widespread barriers to adaptation. The fragmentation of adaptation planning, the existence of institutional voids and crowdedness, and the lack of suitable decision-making mechanisms are commonly observed examples of institutional and governance related barriers to adaptation. There is a fragmented

[7] Interview with national policy makers

approach to adaptation planning in Caribbean SIDS which often takes place in silos. Multiple state agencies and regulations exist to manage various issues related to climate change, but adequate oversight and coordination mechanisms are lacking. The fragmented approach to adaptation planning in Caribbean SIDS is manifested in the failure to sufficiently integrate adaptation projects into strategic action plans as illustrated in section 5.4.1. There are unclear and overlapping mandates among government agencies involved in adaptation leading to competition for resources and the duplication of adaptation efforts. This has highlighted the need to streamline adaptation planning within Caribbean SIDS. Evidence of this streamlining is already taking place with the establishment of government departments exclusively dedicated to dealing with climate change issues, as well as the creation of national climate change policy frameworks. However, much of this work is in its infancy and there are still key lessons to be discovered.

There is the simultaneous existence of 'crowdedness' as well as 'voids' within the institutional landscape for adaptation in Caribbean SIDS. Crowdedness exists in that there are multiple overlapping policies and regulatory mechanisms which speak to the issue of both adaptation and mitigation. For example, McCalla (2012) in a review of policy, plans, legislation, and regulations for climate resilience in Jamaica identified fifty-seven climate change related planning instruments – the sheer number of which necessitates the need for rationalization to remove unnecessary redundancies and make the implementation process more efficient. Institutional voids arise when the requisite policy and legislative mechanisms needed for adaptation are either non-existent or out-dated and have lost their efficacy (see Biesbroek et al., 2011). For example, the spatial development plans, policies, building codes, etcetera in many Caribbean SIDS are out-dated and cannot be relied on to create the transformational change

needed to build a society that is resilient to climate change. In addition, out-dated planning regulations are difficult to enforce.

An institutional void that often goes unnoticed within Caribbean SIDS is the absence of detailed implementation plans accompanying adaptation and mitigation related policies. If the adage that *"a plan is as good as it is implementable"* holds true, then policies should not merely be sterile aspirational documents, but a roadmap for concrete actions. In most cases, there is a time lapse between developing policies and creating implementation plans because the resources needed for implementation are rarely present during the policy development phase of adaptation planning. In the case of the Regional Framework used to guide CARICOM's response to climate change, the accompanying Implementation Plan was created in in 2011, two years after the framework was established.

As outlined in detail in sections 3.6.3 and 5.4, formal local government is poorly developed, and in some cases totally absent from the governance landscape in Caribbean SIDS. This means that there is limited local capacity to undertake substantive adaptation planning. In the absence of effective formal local government arrangements, community-based governance networks are beginning to fill this void. Emerging evidence from the Caribbean suggests that community-based governance mechanisms with links to formal governance institutions are effective in strengthening disaster risk management and managing coastal resources (see Mercer et al., 2012; Pugh, 2013; Tompkins, 2005; Wise, 2014). The involvement of community-based governance networks in local adaptation planning is predicated on the assumption that self-organization, networking, and participation among stakeholders is more effective in shaping decision making at smaller scales of governance than relying solely on rigid formal planning mechanisms.

Attempts at strengthening local adaptive capacity within Caribbean SIDS by means of local government reform have yielded mixed results. As part to the local government reform program in Trinidad and Tobago, the Ministry of Rural Development and Local Government in partnership with the municipal authorities, also referred to as regional corporations, have prepared a series of local plans to guide development. However, very little explicit attention is given to the issue of climate change adaptation and mitigation within these plans. In Jamaica, local municipalities otherwise called parish councils in partnership with several central government agencies have been engaged in an on-going project to prepare Local Sustainable Development Plans (LSDPs) to guide orderly growth and development within the island's parishes. The LSDPs are intended to help localize Jamaica's Vision 2030 National Sustainable Development Plan, as well as advance local government reform by strengthening the capacity of municipalities to undertake long-range planning for sustainable development. Some of the LSDPs directly acknowledge the relationship between climate change and local sustainable development, while others indirectly do so. However, both in Jamaica and Trinidad and Tobago, there is no legal requirement for municipalities to undertake spatial development planning, inclusive of climate change adaptation and mitigation. Furthermore, the plan preparation process has proven to be extraordinarily lengthy and implementation is very weak.

7.3.4 Conflicting Scales

Conflicting scales, more specifically, balancing short-term economic growth objectives with long-term adaptation is a challenge for Caribbean SIDS. While both the academic and grey literature frame adaptation as part of the sustainable development process (see Bishop & Payne, 2012; Janetos et al., 2012; Mimura et al., 2014; Schipper, 2007), observations from planning practice within Caribbean SIDS suggest that there is a struggle to reconcile both objectives.

Planners surveyed rank differences between short-term planning and project cycles and long-term climate change projection and impacts as a significant barrier to adaptation (see Table 6.2). Although national vision plans contain laudable sustainable development goals, there is a limited integration of environmental considerations into socio-economic policies and strategies.

Essentially, the blueprint which defines the planning agenda of national governments is not so much long-term vision plans, but medium term socio-economic frameworks. These medium-term socio-economic frameworks typically span 3 – 5 years which allow them to fit neatly into the five-year national election cycle of respective Caribbean SIDS. Ideally, they are supposed to act as a mechanism for incrementally implementing long-term vision plans. However, interviews with senior policy makers from across the Caribbean revealed that climate change adaptation measures contained in long-term vision plans are not sufficiently translated into medium-term socio-economic frameworks within Caribbean SIDS. This is due to the overwhelming preoccupation of national governments with achieving rapid tangible economic growth – a necessity as well as a very important political selling point to the electorate.

7.3.5 Leadership and Political Will

Leadership as a barrier to adaptation is often confined to political will at the expense of excluding the private sector and civil society. However, both the planners surveyed and policy makers interviewed showed a broad appreciation for the notion of leadership and included members of the private sector and civil society as leaders who can champion the case for adaptation. Nonetheless, political will remains very important, particularly as it relates to several aspects of adaptation planning.

National governments in Caribbean SIDS have demonstrated a high level of commitment to international conventions, protocols, and treaties dealing with climate change. One can argue that to some extent, this commitment is extrinsically motivated in that it is driven by external rewards, i.e. Caribbean SIDS being able to access international donor funding to support adaptation and mitigation. Policy makers interviewed noted that mainstreaming climate change into planning policy is a requirement for receiving international donor funding and development loans. Hence, in terms of policy development, climate proofing is taking placing within Caribbean SIDS. However, tangible commitment or political will to address climate change is not limited to policy development but is also allied with the issue of enforcement.

The absence of political will was identified as a major contributory factor to the weak enforcement of planning regulations which support adaptation. While all of the policy makers interviewed acknowledged that the resources and institutional capacity to enforce existing planning regulations are limited, it was felt that the political repercussions from enforcing unpopular adaptation measures are also major reasons as to why Caribbean SIDS are reluctant to undertake greater enforcement. Information gleaned from the survey and the interviews suggest that barriers to adaptation such as the proliferation of informal settlements, and the encroachment of development on ecologically sensitive lands within Caribbean SIDS is to a large extent attributable to the failure of the political directorate to enforce existing planning regulations.

7.3.6 Communication and Collaboration

Barriers related to poor communication and collaboration among stakeholders involved in adaptation are often rooted in the fragmentation of planning and divergent interests among various stakeholder groupings. Divergent interests and interpretation of policy problems often

lead to poor communication and conflict among stakeholders involved in adaptation. Poor communication between the political directorate and the scientific community not only create mistrust and misunderstanding but also results in decision-making not reflecting the best available science.

Conflict among stakeholders is often traditionally framed in terms of dualities, e.g. environmentalists versus developers. However, stakeholder interaction is much more complex and nuanced, reflecting changing power dynamics and strategic interests. Even when stakeholders share a common objective, they do not always agree on the way forward resulting in a lack of action. This is illustrated in Box 3 which describes how the failure of stakeholders to reach a consensus on how best to address the issue of sea level rise and beach erosion in the coastal community of Negril has resulted in inaction with no firm decision on the way forward.

Box 3 Negril Breakwater Project

Noticeable beach erosion has been observed and documented in Long Bay, Negril – Jamaica since the late 1990s. The draining of the wetlands in the 1950s, removal of mangroves, removal of sea grass beds, ad hoc construction of hard protective infrastructure, and overall poor enforcement of planning regulations were identified as among the causes of the erosion. In 2006, the Negril Coral Reef Preservation Society (NCRPS) commissioned a study on beach erosion in Negril to identify possible solutions to the problem. The recommendations put forward focused on building a series of underwater structures, as well as beach nourishment.

As part of the GOJ/EU/UNEP "Enhancing the Resilience of the Agriculture Sector and Coastal Areas to protect livelihood and Improve Food Security" project, approval was granted in 2014 for the construction of two off-shore breakwater structures in Negril. This was under a previous administration led by the Peoples' National Party. The breakwaters were to be built to withstand a 1 in 100-year wave action and were intended to form part of a beach management strategy to slow the pace of erosion in Negril by strengthening coastal protection. An Environmental Impact Assessment (EIA) report was submitted to the National Environment and Planning Agency in 2014. The EIA was roundly criticized by local environmental group and activists as being too simplistic in its assessment.

Several powerful stakeholders in Negril voiced strong opposition against the project on several grounds. Among the stakeholders who opposed the project were: the Negril Chamber of Commerce, Negril Chapter of the Jamaica Hotel and Tourist Association, Negril Entertainment Association, and the Westmoreland Hemp and Ganja Farmers Association. The issues raised included:

1. Inadequate stakeholder consultation (which the planning authorities deny)
2. Examples of irreversible damage caused by failed breakwater projects elsewhere in the world.
3. The high cost involved in undertaking a potentially irreversible project, with no sure guarantee of success.
4. Insufficient consideration of alternative measures, namely soft measures, e.g. beach nourishment.
5. The need for a more holistic approach to addressing beach erosion, involving restoring damaged ecosystems to secure ecosystem services.

Relenting opposition by the stakeholders to the controversial breakwater project eventually resulted in the new Jamaica Labour Party administration scrapping the project in 2016, with no firm decision in sight on the way forward.

Source: Compiled using data from interviews with national and local policy makers and several newspaper websites.

7.3.7 Perception and Awareness

The common sentiment expressed in the survey, as well as interviews, is that greater awareness of climate change leads to higher levels of public and political support for adaptation. This view concurs with the adaptation planning literature which asserts that a lack or improper knowledge of climate change leads to inaction, or at best reactive forms of adaptation which can potentially prove to be maladaptive (Barnett & O'Neill, 2010; Fussel, 2007; Lata & Nunn, 2012). Planners surveyed ranked insufficient understanding of climate change and the urgent need to adapt as a significant barrier to adaptation. Policy makers interviewed opined that a greater level of public awareness and interest in climate change is essential to keeping the issue in the limelight, as political will and policy agendas are influenced by popular interests. In this regard, public awareness can serve to stimulate useful policy debate and action, through advocacy by civil society groups.

However, climate change tend to receive heightened attention in the public domain only when there is an extreme weather event. As a senior policy maker noted "Everybody reacts when there is a disaster and so on, but in normal times people don't take this thing seriously" (Interviewee 19, personal communication, September 2017). This points to the need for sustained public sensitization and awareness campaigns to keep the issue of climate change in the forefront of the minds of the populace. Admittedly though, this is a challenging task given the host of other pressing issues which compete for public attention in the media. Creative ways are needed to keep climate change on the minds of political leaders and members of the public, beyond the temporary euphoria which usually occurs in the wake of extreme weather events, only to evaporate with the passing of time as other issues take over the news and social media.

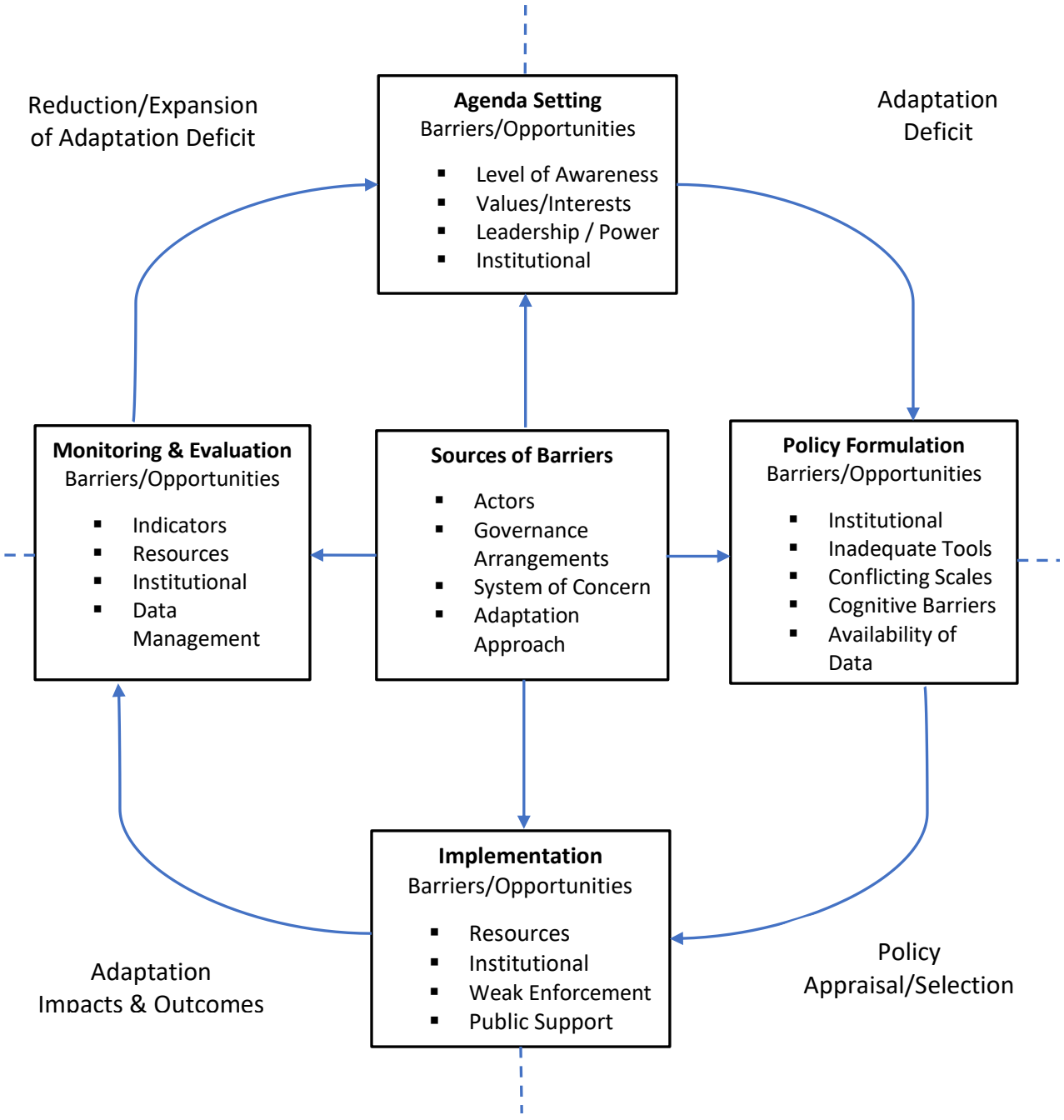
In addition to on-going initiatives aimed at sensitizing the public and creating awareness of climate change, more research and education is needed to better understand the nuanced and practical implications of climate change for development in Caribbean SIDS. This is necessary to overcome fear and uncertainty in responding to climate change. Collaborative initiatives between the government and the private sector are being explored in Jamaica, with a view of sensitizing developers with respect to adaptation in the water sector. In the area of education, plans are afoot to develop training programmes for tradesmen, e.g. masons and carpenters to deliver the building technologies that are needed for adaptation (Interviewees 7, 8, 9, & 10., personal communication, August 2017). On a regional level, content analysis of climate change policies from several Caribbean SIDS indicates sensitization and awareness of climate change is the second leading thematic area of focus (see Figure 5.5). This suggests that Caribbean SIDS are making meaningful progress in improving the awareness of climate change. However, current efforts must be sustained to make lasting changes in knowledge, attitudes, and behavioural practices.

7.4 Linkages between the Barriers to Adaptation and Planning Processes

Figure 7.1 depicts the relationship between the barriers to adaptation and the different stages of a rational oriented adaptation planning process. Barriers to adaptation emanate from a variety of sources. These include the behaviour of the different actors involved in adaptation planning. Behaviour is influenced by diverse values and interests among the actors. Barriers may also arise due to deficiencies within established decision-making mechanisms or governance arrangements. The degree of complexity and dynamism associated with the system of concern or object of adaptation can create varying challenges for adaptation. Lastly, any given approach to adaptation planning, e.g. ecosystem-based adaptation, community-based adaptation, hazard-risk

model, scenario based adaptation planning, or a combination of approaches, has its associated challenges. Because the adaptation planning process is iterative, barriers persist throughout all the stages of adaptation planning, with the cross-cutting barriers affecting multiple stages.

Figure 7.1 Conceptual Linkages Between the Barriers to Adaptation and the Planning Process



The existence of an adaptation deficit serves to trigger an adaptation planning process. A policy agenda is created and key issues are identified and prioritized to address the adaptation deficit. Climate risk and vulnerability assessments are useful in informing the policy agenda for climate change. This is followed by the development of a suite of robust policy interventions to match various possible climate change and socio-economic scenarios which may arise. Policies are critically appraised using various analytical tools, e.g. Cost Benefit Analysis (CBA), and Multi-Criteria Analysis (MCA) to determine optimal policy choices for implementation (Ellen et al., 2016). The implementation process may be incremental or comprehensive, depending on resource availability, political support and public buy-in. Through the monitoring and evaluation process, the impacts and outcome of adaptation policy interventions are realized. If the impacts and outcomes of adaptation policies lead to increase resilience and reduced vulnerability, this will help to close the adaptation deficit. Conversely, if the impacts and outcomes of adaptation policy lead to maladaptation, then there will be a further expansion of the adaptation deficit.

The data presented in chapter five suggest that much of the adaption planning activities within Caribbean SIDS are confined to the right half of the quadrant, particularly the top right quadrant. This is largely attributable to lack of resources for implementation, and monitoring and evaluation which has prolonged the early stages of adaptation planning in many Caribbean SIDS. Consequently, there is limited or slow progress towards the latter stages of the adaptation planning. The same pattern is true even for many places in the developed world (see Baynham & Stevens, 2014; Ford et al., 2011; Ekstrom & Moser 2014; Tompkins et al., 2010; Uittenbroek et al., 2013). This explains why to date, researchers have uncovered from practice only a handful of barriers related to the latter stages of adaptation planning process, i.e. implementation and monitoring and evaluation, compared to the agenda setting and policy formulation stages. In fact,

much of the barriers related to the latter stages of the adaptation planning process are anticipated barriers, as opposed to actually observed barriers.

7.4.1 Agenda Setting

The planning agenda within Caribbean SIDS is influenced by multiple competing factors and dynamic power arrangements. As previously established in sections 3.3, 5.3.1, and 6.3.3, there is a need for greater levels of economic growth and development within Caribbean SIDS (see Bishop & Payne, 2012; ECLAC, 2010). Consequently, every day 'bread and butter' issues such as reducing unemployment, crime, improving health care, and education are the 'saleable items' which essentially dominate the planning agenda in Caribbean SIDS, given that funding for long-term adaptation is scarce. Planning agendas are often explored during election campaigns and framed during the early months in office. Politicians naturally favour attending to short and medium terms issues which can be addressed during their term in office.

Even though climate change adaptation and mitigation planning are long-term processes, short-term thinking and approaches are often employed by politicians to maintain control over the planning process. This opens up the prospect for maladaptation, as seemingly workable short-term adaptation planning measures may prove to be a failure in the long run. As the governance landscape within the Caribbean evolves, increased advocacy regarding environmental matters by civil society and community groups is also helping to push climate change on the planning agenda. Stipulations attached to donor funding for climate change increasingly require broad-based stakeholder participation. This indirectly helps to give civil society a greater role in adaptation planning.

Adaptation planning in practice is often driven by extreme events (Abunnasr, Hamin, & Brabec, 2015; Djalante et al., 2011; Serrao-Neumann et al., 2015). This also holds true for Caribbean SIDS where more frequent extreme weather events and the need to protect life, property, and minimize damage are the major catalysts causing climate change to gain increased attention within the public domain. However, much of this attention is often temporary and is not sustained long enough for climate change to receive top priority on the policy agenda and not be crowded out by short-term 'bread and butter' issues identified above. In other words, although climate change is on the policy agenda of respective Caribbean SIDS, it does not receive the priority treatment it deserves. One of the planners who participated in the survey noted that:

> Frequent exposure to natural hazards appears to promote autonomous adaptation or wider discourse on the need for national level/government sponsored interventions such as legislative reform or incentivizing behavioural change. Complacency sets in when extensive time lapses between each devastating or threatening hurricane event. Other factors that keep climate change in the public domain appears to be when reputable international or regional reports and publications appear in the local press, especially if topics relate to small islands, sea-level rise, coral bleaching/loss of reefs and greenhouse gas abatement (Respondent # 50, e-survey, June 2017).

The agenda for sustainable development planning within Caribbean SIDS is heavily influenced by international development agencies due to the strong reliance on donor funding to drive development planning (Bishop & Payne, 2012; Medeiros et al., 2011; Pugh, 2013). Donor funding is very specific in terms of what the monies can be used for. Hence, if internationally funded adaptation initiatives are not sufficiently distilled to meet local needs, the agenda of the donor agencies can unwittingly become the default climate change agenda for Caribbean SIDS.

Without downplaying the influence of international donor funding in shaping the climate change agenda in Caribbean SIDS, it is also important to note that for their own functioning, the agenda of international development agencies cannot be designed to meet the unique needs of individual Caribbean SIDS. A major problem in some Caribbean SIDS appears to be the lack of a comprehensive climate change policy and action plan which can be used for the dual purpose of effectively engaging international donors while providing concrete guidance for local adaptation and mitigation. This, however, is being addressed through the creation of broad-based multi-sector national climate change policy and action plans by Caribbean SIDS (see Table 3.3).

7.4.2 Policy Formulation

Cognitive barriers, more specifically limited perception and awareness of climate change on the part of political leaders and members of the public, influence their conceptual understanding of the issues related to climate change in Caribbean SIDS. This, in turn, shapes how the policy response to climate change is framed. In section 5.2.2, the survey results suggest that climate change vulnerability is primarily regarded as physical phenomena arising from exposure to climatic hazards. The less visible underlying socio-economic factors which influence vulnerability, e.g. poverty, inequality, poor governance and livelihood practices were considered as less significant. This thinking explains why the planning response to climate change within Caribbean SIDS has been largely fashioned following the hazard-risk reduction model. What this translates to in practice is that adaptation strategies start with detailed assessments of anticipated climatic hazards and stressors in order to derive hazard specific adaptation measures. While this reflects a very pragmatic approach to climate change adaptation, it ignores the non-physical dimensions of adaptation.

The available mechanisms for operationalizing policy goals can serve to constrain or enable the design of adaptation policies. If the available regulatory mechanisms include an array of instruments, e.g. taxation, development standards, fiscal incentives, and punitive measures, it allows for the creation and use of more diverse policy options. Content analysis of national climate change policies from Caribbean SIDS and interviews with policy makers revealed that there is very limited use of market-based tools to support local adaptation. Although there is a nested suite of policy instruments which support adaptation planning in Caribbean SIDS, namely the Regional Framework for Climate Change, national vision plans, national climate change policy / action plans, national spatial plans, and sectoral plans, the planning agenda is operationalized through the use of medium-term socio-economic frameworks. These medium-term socio-economic frameworks are essentially used to align planning with political cycles and are unsuitable for delivering the long-term transformational policy solutions that are needed to address climate change.

The fragmentation of planning into silos makes it difficult to harmonize or integrate adaptation and mitigation policies across multiple sectors. The perception among some of the policy makers interviewed is that this is deemed by the political directorate to be a complicated and time-consuming task for limited resources to be spent on, especially when there are other urgent pressing needs to attend to[8]. Although climate change is recognized in high-level national vision plans as a cross-cutting issue, it is treated in planning practice as separate from other pressing socio-economic concerns which the political leadership must address (Scobie, 2016). Very few Caribbean SIDS have institutionalized inter-agency coordination mechanisms to enable cross-scale integration of adaptation and mitigation policies. The establishment of a Climate

[8] Interviews with policy makers from across the Caribbean.

Change Division within Jamaica (see Box 2) is one example of an attempt to address this problem.

7.4.3 Implementation

As discussed in section 7.2.3, resource constraint is the major barrier to implementation within Caribbean SIDS. Much of the adaptation effort in Caribbean SIDS is delivered through time-bound projects which cannot always be replicated on a sustained basis due to a lack of financing. As with the other stages of adaptation planning, politics also influence the implementation process. Implementing climate change related policies is prioritized if they can bring political mileage to politicians in the form of visible projects with tangible benefits for their local constituents. Implementation of adaptation measures also involves enforcement of planning regulations. However, the failure to update and review planning regulations on a timely basis renders them static and out-dated with very little or no enforceable value. Even in cases where plans are current, the capacity and political will for undertaking enforcement are weak – relying on centralized planning frameworks which are often removed from the local context. The fragmentation of planning into silos is a major barrier which also influences the implementation process. Poor coordination among state entities involved in adaptation and mitigation activities often result in a duplication of adaptation efforts and inefficient use of limited available resources.

7.4.4 Monitoring and Evaluation

The survey and interview results outlined in section 5.3.2.3 indicate an absence of standardized mechanisms and resources for undertaking systematic monitoring and evaluation of adaptation within spatial planning agencies. Content analysis of national climate change policies

and spatial development plans revealed that in most cases they are developed with no indicators for monitoring and evaluating them. In cases where indicators exist, they are not sufficiently contextualized to reflect the local realities. Plans and policies which contain indicators for monitoring essentially adopt the indicators attached to the United Nations 2030 Sustainable Development Goals (SDGs) without giving sufficient regard as to whether or not data is available locally to support the use of such indicators. Currently, indicators used to monitor and evaluate adaptation in Caribbean SIDS are mainly tied to risk and damage assessment, e.g. loss of life and damage to property, including public infrastructure.

There is a culture of poor record keeping and data management among government agencies. As highlighted in section 5.3.3, the lack of a knowledge platform at the national level within respective Caribbean SIDS results in the very limited exchange of information among the actors involved in adaptation planning – information that is necessary to support monitoring and evaluation across multiple sectors. Monitoring and evaluation is primarily undertaken as a requirement for donor-funded projects. However, this is not sufficient to assess the extent to which collective progress is being made in terms of climate change adaptation and mitigation, pointing to the need for higher level program and policy evaluation. Outside of project evaluation, ad hoc environmental reporting is used as a proxy for monitoring and evaluating adaptation.

7.5 Addressing the Barriers to Adaptation Planning in Caribbean SIDS

7.5.1 Guiding Principles for Addressing the Barriers to Adaptation

This section explores how the barriers to adaptation in Caribbean SIDS can possibly be addressed. As in other policy domains, it must be noted that there is no one size fits all

prescription for addressing the barriers to adaptation. Barriers are highly contextual. Existing adaptive capacity and the on-going changing circumstances of each policy context play a critical role in determining how we treat the barriers to adaptation. Any case study of the barriers to adaptation within a given locale represents a snapshot assessment which captures the barriers as they manifest themselves at a given point in time. Hence, devising a prescriptive model to address the barriers to adaptation based on a static analysis is unlikely to prove very useful in a dynamic policy-making environment. This would be tantamount to a closed 'black box' thinking predicated on a highly linear and functionalist approach in which the complexities involved in adaptation decision-making are reduced to simple input-output models (Biesbroek et al., 2015; Innes & Booher, 2010). Rather than providing a structured step-by-step methodology for overcoming the barriers to adaptation, five general guiding principles for addressing the barriers to adaptation are discussed. These principles are flexible in their application and can be amended to fit the different contexts in which adaptation planning takes place.

i) Effectively Diagnose Identifiable Barriers

Effective understanding and treatment of the barriers to adaptation is contingent upon a sound diagnosis of identifiable barriers. A combined two-pronged approach to diagnosing the barriers to adaptation inspired in part by Moser & Ekstrom (2010) involves:

a) identifying the source or origins of the barriers; and
b) categorizing the barriers relative to the power and resources available to policy makers to address the root causes of the barriers.

The findings of this research, substantiated by the adaptation planning literature, identified four major sources of barriers to adaptation: the actions of the actors involved in the adaptation process, the institutional arrangements and governance processes for adaptation

decision-making, the system of concern, and the adaptation approaches chosen (Biesbroek et al., 2013; Eisenack et al., 2014; Hamin et al., 2014; Moser & Ekstrom, 2010). The research findings suggest that many of the institutional and governance constraints to adaptation in Caribbean SIDS are a legacy of historical planning arrangements, which though unsuitable for addressing the contemporary planning challenges posed by climate change, are still operating today. For example, the centralization of planning and the historical neglect of local management and governance structures are major contributory factors to the lack of local capacity for adaptation planning in Caribbean SIDS. Though challenging to overcome, policy makers can work through this problem by undertaking incremental institutional and governance reform which allows for greater local participation in adaptation decision-making. Evidence of such reforms is taking place within Caribbean SIDS and has yielded positive results. For example, local government reform initiatives in Jamaica and Trinidad and Tobago have resulted in the preparation of local sustainable development plans in partnership with various local stakeholder groups[9]. Civil society groups in Caribbean SIDS are also playing an increasingly greater role in local governance. In some cases, increased advocacy from civil society has led to the abandonment of controversial policy decisions (see Box 3), gradually resulting in a reconfiguration of power arrangements.

Some barriers originate in the actions of actors who operate at the national, regional, and global levels, outside of the local planning context. These barriers are described as remote barriers because they originate outside of the immediate policy context over which policy makers have no control (Moser & Ekstrom, 2010), but nonetheless, have a profound impact on local adaptation. Example of remote barriers which affect adaptation in Caribbean SIDS is the failure

[9] Interview with policy makers from across the Caribbean and review of selected policy documents.

of the leading global emitters of greenhouse gases to agree to firm emission targets and actually abide by them. If there was a firm commitment, backed up by tangible actions, this would likely to help reduce some of the uncertainty regarding adaptation planning, as policy makers would have more credible emission scenarios on which to base long-term adaptation plans and policies. Confronted with problems of this nature, policy makers in Caribbean SIDS would be best advised to work around the problem, as they cannot realistically overcome such barriers at their source. Working around the problem would involve assessing multiple scenarios and planning for the worst-case scenario, or better yet develop several contingency measures for dealing with a combination of multiple scenarios.

ii) Barriers are Complex, Dynamic and Highly Interrelated

In terms of significance, very little disparity was observed in the ranking or weighting assigned to the individual barriers by the planners surveyed. This is highlighted in section 6.3.1. Beyond ranking and categorizing the barriers to adaptation, understanding the dynamic interrelationship which exists among identifiable barriers within any given policy context is of critical importance to addressing the barriers to adaptation. Nonetheless, attempts at ranking and categorizing the barriers to adaptation can be helpful in both explaining the challenges to adaptation, as well as describing how public policies can successfully address these challenges (Biesbroek et al., 2015; Eisenack et al., 2015). Barriers often influence and create other barriers (Eisenack et al. 2014). For example, findings from the survey and interviews indicate that weak enforcement of existing planning regulations - in part due to the lack of political will and resources, has led to encroachment on ecologically sensitive and hazard-prone lands. This, in turn, has increased the vulnerability of Caribbean SIDS to climate change. Several other barriers identified in the survey also showed causal linkages with each other. Causal linkages among the

barriers to adaptation necessitate addressing them in an integrated manner, and not in isolation from each other.

Although the adaptation literature differentiates among the sources of the barriers to adaptation (Eisenack et al., 2014; Hamin et al., 2014; Moser & Ekstrom, 2010), there is a complex web of interaction between the barriers. Actors involved in the adaptation planning process create or utilize existing institutional and governance arrangements to craft and implement adaptation policies. Policy interventions are targeted at various 'systems of concern,' e.g. different economic sectors, public infrastructure, and local communities are likely to pose certain barriers to adaptation owing to their inherent complexity. In addition, any preferred approach towards adaptation, e.g. bottom-up approach, top-down approach, multi-level approach, will require institutional and governance arrangements which are conducive to utilizing such an approach. Likewise, the various approaches to adaptation influence the extent to which the different actors are involved in the adaptation process and the ways in which they can leverage their influence. For example, a bottom-up approach to adaptation requires more direct involvement of local stakeholders in the adaptation planning process, compared to a top-down technocratic driven approach. However, weak or non-existent local government arrangements in Caribbean SIDS make it more difficult to engage in bottom-up forms of adaptation planning.

iii) Priority Should be Given to Cross-Cutting Barriers

There is a large number of identifiable barriers to adaptation in Caribbean SIDS. Some of the barriers are confined to one or two stages of the adaptation planning process, while others are cross-cutting involving all stages of adaptation planning. The findings revealed that ranking the individual barriers to adaptation is insufficient to determine their significance or importance.

Understanding the interrelationship among the individual barriers is of utmost importance. However, various constraints inhibit tackling all the all the barriers to adaptation at once. Given the resource constraints within Caribbean SIDS, it is necessary that barriers be prioritized to help guide and streamline adaptation interventions. In so doing, those cross-cutting barriers such as institutional arrangements, resources, and leadership which directly affect all stages of the adaptation planning process should be accorded top priority.

iv) Identify Windows of Opportunity for Intervention

The timing of adaptation initiatives is an important factor which can either advance or retard adaptation efforts. While it is much easier to undertake incremental no-regret adaptation measures (Fussel, 2007; Ranger & Garbett-Shiels, 2012), this kind of effort is not enough to bring about the deep-seated transformational changes needed to address the magnitude of risk and vulnerability which climate change poses to human and natural systems. Radical transformational changes to the institutional and governance arrangements intended to support adaptation are likely to be met with stiff resistance due to embedded path dependency (Gualini, 2001). It is, therefore, important to identify and capitalize on opportunities for incremental change, while being prepared to exploit opportunities for transformational change whenever they present themselves – usually in the aftermath of severe and widespread climatic disasters.

One way by which Caribbean SIDS can prepare for transformational change is to create long-term vision plans, even when there are no resources available for immediate implementation. This is a helpful tool for engaging donors and capitalizing on available international development aid whenever there is a widespread climatic disaster which warrants comprehensive reconstruction. The urgency with which reconstruction have to be undertaken following a devastating climatic event does not allow for time and resources to be channelled

into policy and plan preparation. If there is no plan in place, reconstruction effort can be ad hoc and follow the same pattern of previous development – essentially recreating the same conditions which led to initial vulnerability. This was the case with Haiti following the devastating 2010 earthquake[10]. The recent widespread destruction of several islands in the Caribbean during September and October, 2017 by hurricane Irma and Maria provide a fertile environment for testing this proposition. However, it is too early to draw any definitive conclusions given that some relief effort is still on-going, and reconstruction is in the early stages.

v) The Approach to Adaptation Should Match the System of Concern

What is being adapted, and what we are adapting to should determine the adaptation measures employed. Any vulnerable system that is affected by climate change and requires adaptation intervention is a 'system of concern'. As depicted in Figure 7.1, 'systems of concern' is also a primary source of barriers to adaptation. Two important questions that should be borne in mind by policy makers are:

a) What is the 'system of concern' to which the identifiable barriers are linked?

b) How will addressing the identifiable barriers impact the 'system of concern'?

Systems are comprised of various elements and attributes and vary in the degree of their complexity. Because the elements within a system are interconnected, a barrier affecting one element is likely to have a cascading effect on the entire system. Within complex integrated social-ecological systems, consideration needs to be given to the impact of adaptation measures beyond the immediate system of concern to account for impacts on a broader scale. Though not

[10] https://www.gfdrr.org/sites/gfdrr/files/publication/GFDRR_Haiti_Reconstruction_KnowledgeNotes_0.pdf

directly stated in the adaptation planning literature, the thinking behind the concept of systems–based policies exist.

Systems-based policies speak to approaches which jointly consider the spatial and functional dimensions of adaptation policy. It recognizes local peculiarities and the interplay between the factors that promote and hinder cross-scale adaptation. This is essential to safeguard against maladaptation due to poor cross-scale harmonization of adaptation policies. For example, the construction of an upstream dam as an adaptation measure in response to perennial drought may increase the supply of water for persons living upstream but destroys the ecology of the estuary downstream by robbing it of vital replenishing sediments. Systems straddle multiple spatial scales which also make this proposed conceptualization of systems-based policies fit neatly into a multi-level approach to climate change adaptation.

7.5.2 Opportunities for Mainstreaming Adaptation

7.5.2.1 Extreme Weather Events

Extreme weather events act as a major driving force or catalyst for adaptation planning in Caribbean SIDS. Unfortunately, the loss of life and destruction of public and private property that occurs in the wake of extreme events provide a window of opportunity to effect the radical transformational changes needed to enable effective adaptation to climate change. In addition to resource mobilization for rebuilding following natural disasters, there is also likely to be to greater political will to implement adaptation policies and less resistance to change (Abunnasr et al., 2015; Pelling 2011a). The recent record-breaking deadly hurricanes of 2017 wreaked unimaginable damage to several islands in the Caribbean, necessitating a total overhaul and rebuilding of much of the public and private infrastructure. On-going damage assessment is still

taking place, but the figure is expected to be USD tens of billions. In the immediate aftermath of hurricane Maria, a category 5 hurricane which severely battered Dominica on September 18th, 2017, the Prime Minister Roosevelt Skerrit signaled his island's vision to become a climate resilient nation. At a press conference in Dominica with the United Nations Secretary-General, Mr. Skerrit stated

> Our devastation is so complete that our recovery has to be total. And so, we have a unique opportunity to be an example to the world, an example of how an entire nation rebounds from disaster and how an entire nation can be climate resilient for the future (UN News Centre, October 8th, 2017).

It is left to be seen what lessons the Caribbean will learn from the 2017 hurricane season, as well as, the policies and changes that the various islands will adopt going forward as the region comes to grip with the 'new normal' created by climate change.

7.5.2.2 Disaster Risk Management

Limited recent research (see Lyles, Berke, & Overstreet, 2017) suggests that planners should first focus on building experience and adaptive capacity in niche areas rather than trying to comprehensively address all the dimensions of adaptation at once. This proposition, although not extensively researched, makes plausible sense in the context of Caribbean SIDS where resource constraints limit adaptation choices. The idea is that where there is limited capacity to address climate change, it is better to start with the aspects of adaptation for which there is existing capacity. One can then extend to other areas rather than trying to overreach, which diminishes the chances of making meaningful progress. The research findings show that within

Caribbean SIDS there is a greater level of institutional support, experience, and expertise in the area of disaster risk management than in other aspects of adaptation planning (see section 5.2.2).

The existing capacity in disaster risk management is now being gradually extended to wider long-term adaptation. For example, the 2017 draft Physical Development Plan for Barbados explicitly recognizes the need to transition from short-term disaster risk management activities to long-term adaptation. Similar sentiments were expressed in interviews with several policy makers from the Caribbean. The emerging trend is an increasing integration of disaster risk management and long-term disaster risk reduction efforts in Caribbean SIDS, even though the adaptation planning literature does not regard the former as climate change adaptation.

7.5.2.3 Integrating Adaptation with Local Sustainable Development

At a strategic level, the discourse on mainstreaming adaptation and mitigation is wedded to the broader issue of sustainable development. As the sustainable development agenda evolves, perspectives on climate change adaptation also evolve in keeping with the changing development narrative (see Silver, Gray, Campbell, Fairbanks, & Grubby, 2015). Within the context of SIDS, the sustainable development agenda has been fashioned around Agenda 21, the 1994 Barbados Plan of Action, the Millennium Development Goals (MDGs), and more recently the Green Economy, the Sustainable Development Goals (SDGs), and the Blue Economy. Common among these evolving narratives is recognition of the need to harmoniously integrate the three pillars of sustainability within the development process. The difference lies in the economic sectors within society which they primarily target.

The Organization for Economic Co-operation and Development (OECD) describes a green economy as “fostering economic growth and development while ensuring that natural

assets continue to provide the resources and environmental services on which our well-being relies. The emphasis is on the synergies and trade-offs between the environmental and economic pillars of sustainable development" (OECD, 2011. p 9). Green development can be operationalized through low carbon development strategies, i.e. economic development plans or strategies that create low levels of greenhouse gas emissions. The development of a green economy is one of the key objectives of the Regional Framework for climate change adopted by CARICOM.

Several CARICOM member states have embarked on the creation of a green economy both as a development strategy, as well as a response to climate change. In 2009, Guyana launched its Low Carbon Development Strategy which aims to position the country on a low carbon pathway by preserving its huge expanse of forest in return for external financing under the Reducing Emissions from Deforestation and Forest Degradation plus (REDD+) initiative (Government of Guyana, 2010). The financing is being used to support the creation of hydroelectric power generation and 'green' rural development initiatives. The government of Barbados in partnership with the United Nations Environment Programme (UNEP) undertook a green economy scoping study in 2012, with the goal of making Barbados the first green economy within the Caribbean. The study outlines a blueprint for Barbados to transition to a green economy in five key sectors: tourism, agriculture, transport, fisheries, housing and construction (Moore et al., 2014). A public sector smart energy programme is being developed with major investments in renewable energy technologies. In addition to the existing use of solar panels, consideration is being given to developing off-shore wind turbines, as well as small wind turbines for use at the household level. There are local outlets where electric cars can be

recharged with solar generated power[11]. The government of Dominica also created a Low Carbon Climate Resilient Development Strategy in 2012 centered on preserving its forest as an eco-tourism attraction. A national Low Carbon Climate Resilient Development Policy was also developed for Anguilla, Cayman Islands, Turks and Caicos Islands, and the British Virgin Islands.

A blue economy combines conservation and growth within the context of oceans to provide a sustainable and integrated development strategy. It enables small island states to utilize the ecosystem services provided by the ocean to develop industries in sustainable tourism, aquaculture, marine biotechnology, and other growth sectors (Mycoo & Donovan, 2017; Rustomjee, 2016). A blue economy adapts many features of the green economy such as environmentally sustainable development and equitable use of resources. However, these are applied in the context of the ocean and maritime economies (Rustomjee, 2016; Silver et al., 2015). Caribbean SIDS are highly dependent on coastal resources to support local livelihoods and national economic growth. A case in point is marine-oriented tourism which is one of the most important sectors of the Caribbean economy. A blue economy can also be considered as a corollary to ecosystem-based approaches to adaptation. Coastal ecosystems such as mangroves, tidal marshes, and seagrass beds function as natural carbon sinks, as well as protect coastal areas from storm surge and flooding. In this regard, the blue economy in Caribbean SIDS plays an important role in both mitigation and adaptation, specifically disaster risk reduction.

[11] Interview with senior policy makers from Barbados.

7.6 Summary and Conclusion

Adaptation planning in Caribbean SIDS is gradually evolving into an established policy domain. Thanks to international donor funding, Caribbean SIDS have made considerable progress in developing a suite of adaptation and mitigation related policies. However, most if not all Caribbean SIDS are somewhat lingering in the early stages of the adaptation planning process (i.e. agenda setting and policy formulation). The resources needed to advance to the implementation and monitoring and evaluation stages of the adaptation planning process are seriously lacking.

Barriers such as inadequate financial resources, poor communication and collaboration among stakeholders, the fragmentation of planning into silos, and ineffective institutional and governance arrangements have severely stymied the implementation of adaptation policies in Caribbean SIDS. Consequently, there has been very little tangible opportunity to observe, monitor, and evaluate the impacts and outcomes of existing adaptation policies. This has prevented policy makers and researchers alike from gaining first-hand experience in managing the barriers that actually do occur in the latter stages of the adaptation planning process. Hence, in terms of practical lessons learned about the barriers to adaptation in Caribbean SIDS, we can only rely on what has been observed to date in the early stages of the adaptation planning process.

With regards to formal capacity building for adaptation in Caribbean SIDS, this is largely taking place at the regional and national levels but lacking at the local level where adaptation planning is confined to ad hoc projects which are not sufficiently integrated into a strategic planning framework. Medium-term socio-economic frameworks which prioritize economic

growth and development dominate the planning agenda and takes precedence over long-term adaptation. This has helped to strategically marginalize the role of spatial development planning in adaptation. Although spatial development planning can play a greater role in climate change adaptation in Caribbean SIDS, enforcement of planning regulations via the planning approval process is weak and needs to be strengthened.

In addressing the barriers to adaptation in Caribbean SIDS, the research findings and the adaptation planning literature confirm that identifiable barriers to adaptation have strong causal linkages and cannot be addressed in isolation from each other. Analyzing the interlinkages between the barriers to adaptation, the power dynamics among actors, and how local institutional and governance works is of paramount importance in understanding the barriers to adaptation and identifying suitable entry points for intervention.

Chapter Eight
Conclusions, Contributions, and Future Research

8.1 Introduction

This chapter concludes the research. It begins by succinctly restating the research problem. The key findings are subsequently outlined in relation to the three research objectives posed in chapter one. The specific contributions of this research to both theory and practice are discussed, as well as the limitations of the research findings. Possible directions for future research emanating from the research findings are suggested. This is followed by the summation of the chapter with the author's personal reflections on this research exercise.

8.2 Research Problem, Objectives, and Key Findings

Restatement of Research Problem

The research problem is centered on the observation that although SIDS are regarded as being most vulnerable to the impacts of climate change, there is limited research on the barriers to adaptation in SIDS, compared to developing countries that are generally considered to be less vulnerable. Where research exists on the barriers to adaptation in SIDS (see Betzold, 2015; Butcher-Gollach, 2015; Lata & Nunn, 2012; Robinson & Doran, 2017; Spires et al., 2014), it does not sufficiently consider the barriers in relation to the actual spatial planning context which exist in SIDS. The failure of the adaptation planning literature to link the barriers to adaptation in SIDS with the planning frameworks through which adaptation policies are developed and implemented has resulted in an insufficient understanding of the barriers in terms of how they are manifested in planning practice.

8.2.1 Objective 1: Evaluate the current state of adaptation planning in Caribbean SIDS

The rational planning model was used to conceptually represent the adaptation planning process in Caribbean SIDS. The use of the rational model outlines a clear and coherent universal planning process which is both relevant to the theory and practice of planning, including adaptation planning. It allowed for a detailed examination of the adaptation planning process in Caribbean SIDS – identifying how adaptive capacity is distributed across the different stages of adaptation planning, as manifested in the relative progress being made in some stages of the planning process compared to others. The data used to address this objective was derived from a survey of planners in Caribbean SIDS, content analysis of select climate change policy documents, and interviews with senior policy makers. The survey and content analysis enabled the identification of key trends in adaptation planning in Caribbean SIDS, while the interviews allowed for an in-depth qualitative assessment of the trends identified.

The key findings are:

1) **The adaptation planning landscape within Caribbean SIDS is characterized by fragmentation, institutional crowdedness, and institutional voids**.

The division of planning into silos has created a fragmented approach to adaptation planning in Caribbean SIDS. Multiple ministries and government agencies are involved in developing and implementing adaptation policies at different levels planning. There are insufficient institutional and managerial oversight mechanisms for interagency and cross-scale coordination of adaptation activities. This coupled with unclear and overlapping mandates among the agencies involved in adaptation planning has resulted in a lack of coordination in the execution of adaptation projects

which are not sufficiently integrated into a long-term strategic action plan. In some cases, scarce resources are not effectively utilized in adaptation efforts. They are duplicated among different ministries as opposed to being streamlined to ensure that they are complementary. The adaptation planning literature suggests that to some extent fragmentation is inevitable due to the far-reaching and diverse effects of climate change across the different sectors of society (Adger et al., 2005; Biermann et al., 2009; Nalau et al., 2015). The implicit argument that is being put forward is that given the divergent interests among the stakeholders involved in adaptation planning, fragmentation can at best be managed but not eliminated altogether.

Institutional crowdedness exists simultaneously alongside institutional voids. There are multiple overlapping laws and planning regulations which address issues related to climate change adaptation, and which needs to be streamlined in order to be meaningfully implemented. In the same vein, as mentioned above, there are limited oversight mechanisms to coordinate adaptation planning. This is most manifest in terms of national-level adaptation. The absence of a robust system of local government is also a notable void in governance which diminishes the capacity to undertake substantive local adaptation planning.

2) **Formal capacity building to support adaptation is mainly taking place at national and regional levels in Caribbean SIDS.**

Although the literature points to the localized nature of vulnerability and climate change adaptation (see Adger et al, 2005; Kelman & West, 2009; Matthews, 2013; Measham et al., 2011; Mercer et al, 2012; Schreurs, 2008; Smit & Wandel, 2006), most of the formal attempts at capacity building for adaptation is taking place at the national and regional levels in Caribbean SIDS. In the absence of well-established and highly functional systems of local government in Caribbean SIDS, substantive policy making for adaptation takes place at the national level.

Informal governance networks which operate at the community level are largely co-opted as local partners in the implementation of adaptation projects and they do not have a strong voice in strategic policy decisions.

3) **The adaptation planning response in Caribbean SIDS largely addresses the physical dimensions of climate change, while ignoring the social and economic aspects.**

Planning policy in Caribbean SIDS, as well as the adaptation planning literature (see Cole 2008, Janetos et al., 2012; Schipper, 2007), frame climate change adaptation as part of the larger process of sustainable development. This, however, is not fully reflected in planning practice in Caribbean SIDS where adaptation follows the risk-hazard model which predominantly focuses on dealing with the physical aspects of climate change vulnerability and not the underlying socio-economic determinants of land use, exposure, and sensitivity to climate change.

4) **There is need to lessen the over-reliance on projects to drive local adaptation in Caribbean SIDS.**

The donor-funded project-oriented approach to adaptation planning within Caribbean SIDS, though useful in the short-term, is fundamentally unsustainable and incapable of delivering the long-term transformational changes needed to build a society that is resilient to the impacts of climate change. Making adaptation a permanent feature of planning requires strengthening development control to ensure that planning regulations which promote adaptation are applied and enforced through the development approval process.

5) **There is the gradual emergence of a comprehensive adaptation planning process in Caribbean SIDS which is helping make adaptation a policy niche**.

When the adaptation planning process is conceptualized using the stages involved in the rational planning model (see Figure 2.1), Caribbean SIDS appear to be in the early stages of

adaptation planning, more specifically policy formulation. However, the resources needed to advance to the latter stages of the adaptation planning process are lacking and cannot be supplied by relying on international donor funding, which to date has been relied on to finance adaptation planning in Caribbean SIDS. Broadening the scope of adaptation financing is imperative for Caribbean SIDS to further advance the adaptation planning process.

8.2.2 Objective 2: Identify and assess the barriers to mainstreaming climate change adaptation in Caribbean SIDS.

Given that the literature identifies numerous individual barriers to adaptation in SIDS, barriers of a similar nature were grouped into categories for ease of analysis. The sources of the barriers, as well as their interrelationship with each other, were examined. Moser and Ekstrom (2010) diagnostic framework for assessing the barriers to adaptation was used to examine the relationship between policy makers and the barriers to adaptation identified in the survey conducted among planners from across the Caribbean. The data used to address this objective was derived from the survey and interviews.

The key findings are:

1) **Most of the barriers to adaptation are highly interrelated and cannot be understood or addressed in isolation from each other**.

The research showed that there are strong causal linkages between the barriers to adaptation in Caribbean SIDS. These causal linkages are best understood by qualitatively assessing the barriers to adaptation to determine how they influence each other. This is an essential prerequisite for developing suitable intervention measures to address the barriers to adaptation in a holistic manner.

2) **Institutional barriers and resource constraints are the most common categories of barriers encountered in Caribbean SIDS**.

Ineffective institutional and governance arrangements constitute a leading cross-cutting barrier to adaptation planning in Caribbean SIDS and are largely manifested in a fragmented approach to adaptation planning in Caribbean SIDS. While resource constraint has been a longstanding barrier to adaptation in Caribbean SIDS, international donor funding for adaptation is helping to alleviate this problem. The lack of resources is now manifesting itself in the implementation, monitoring and evaluation stages of adaptation planning, as opposed to the earlier stages of the adaptation planning process, as was the case in previous decades.

3) **Barriers often originate from a dynamic combination of factors, as opposed to a single factor, and have a cascading effect within social-ecological systems**.

Although analytical frameworks for assessing the barriers to adaptation such as those proposed by Biesbroek et al., (2013); Eisenack et al., (2014); Ekstrom and Moser (2014) place the barriers to adaptation into discrete categories for ease of analysis, in reality barriers to adaptation highly overlap with each other and do not lend themselves to rigid categorization. In addition, barriers to adaptation also act as change factors within social-ecological systems in that the existence of one barrier spawn other barriers. Likewise, eliminating key barriers also remove other barriers.

8.2.3 Objective 3: Explore the linkages between the barriers to adaptation and the planning and policy frameworks which exist in Caribbean SIDS

Inspired by Moser and Ekstrom (2010) and Clar et al (2013), a simplified conceptual representation of how the barriers to adaptation intersect with the planning process, as shown in Figure 7.1, was used to explore the linkages between the barriers to adaptation and the different

stages of the adaptation planning process within the context of Caribbean SIDS. Contextual information regarding planning practice in Caribbean SIDS was juxtaposed with the conceptual model. This allowed for a positive analysis of how the barriers to adaptation manifest themselves in the existing planning and policy-making context of Caribbean SIDS. The data used to address this objective was a summary of the survey, content analysis, and interview results.

The key findings are:

1. **From a high-level planning perspective, climate change adaptation is reasonably established on the planning agenda at the regional and national levels in Caribbean SIDS but is overlooked in operational plans and policies**.

The Regional Framework for climate change along with the accompanying Implementation Plan establishes climate change on the planning agenda of CARICOM. At the national level, long-term vision plans and spatial development plans guide sustainable development, including climate change adaptation and mitigation. However, it is the medium-term socio-economic policy frameworks used by the political directorate which effectively dictate the planning agenda in Caribbean SIDS. While the long-term national vision plans contain laudable goals and objectives related to climate change adaptation and mitigation, these objectives are not sufficiently making their way into the medium-term socio-economic frameworks which heavily focus on generating immediate economic growth and poverty alleviation, as opposed to long-term adaptation.

2. **Despite the presence of a Regional Framework for climate change, the national level is where substantive planning agendas are developed and policies formulated.**

The Regional Framework for climate change while serving as a guide to adaptation and mitigation for national governments within CARICOM has no legally binding authority.

CARICOM working through the CCCCC does not provide any on-going firmly guaranteed technical and financial support to member states in implementing the provisions of the Regional Framework. Whatever support that is given is temporary, ad hoc, and is woefully insufficient to ensure that member states implement the Regional Framework in a timely manner. Most of the core features of adaptation planning within CARICOM takes place at the national level. Essentially, a disjointed multi-level governance arrangement exists for managing climate change within CARICOM.

3. **The barriers to adaptation are likely to arise simultaneously rather than in a stepwise linear fashion as depicted in the adaptation planning literature**.

The adaptation planning literature makes a stepwise linear connection between the barriers to adaptation and the stages involved in the planning process (see Clar et al., 2013; Ekstrom & Moser 2014; Moser & Ekstrom 2010). However, in reality, the cyclical iterative nature of the adaptation planning process with its multiple feedback loops, is indicative of the fact that at any given point in time several stages of the planning process are likely to be undertaken concurrently. Therefore, overcoming the barriers in any given stage of the adaptation planning process may not necessarily result in encountering fewer barriers in the other stages in the planning process due to the changing dynamics within a given planning context.

4) **Barriers to adaptation are best understood in relation to the entire planning process, rather than the individual stages of the planning process.**

The research findings, as well as the adaptation planning literature, indicate that the barriers to adaptation are highly interrelated and cannot be effectively understood and treated in isolation from each other (see Biesbroek et al., 2013; Ekstrom & Moser, 2014; Eisenack et al., 2014; Hamin et al., 2014). Furthermore, barriers to adaptation also act as change factors as some

barriers create other barriers resulting in a ripple of barriers throughout the entire planning process.

8.2.4 Additional Discussion Points

In addition to the above research findings, a number of additional discussion points were also featured in this research. After examining the research findings on the barriers to adaptation, consideration was given to developing a guiding set of principles which can serve as a heuristic for addressing the barriers associated with mainstreaming climate change adaptation into planning within Caribbean SIDS. Given the differential vulnerability and adaptive capacities which exist within respective Caribbean SIDS (see Dulal et al., 2009; Rhiney, 2015), the principle of flexibility was used to inform the exploration of possible ways to address the barriers to adaptation in Caribbean SIDS. It was felt that a flexible set of guiding principles would be more effective than a static model in devising practical solutions to addressing the barriers to adaptation in Caribbean SIDS. The research findings were also used to identify existing opportunities for mainstreaming adaptation into planning within Caribbean SIDS.

The additional discussion points that were raised are:

1. Not all barriers to adaptation planning in Caribbean SIDS can be addressed in terms of their root causes. Effectively diagnosing the barriers to adaptation will enable policy makers to determine their root causes and decipher which barriers they have the power and resources to overcome, as opposed to those barriers which they have to work around because they have no power or control over them.

2. Path-dependent planning and resistance to climate change mean that extreme weather events continue to offer the greatest opportunity for undertaking radical changes needed to urgently mainstream adaptation planning within Caribbean SIDS.
3. The capacity for responding to climate change in Caribbean SIDS is most developed in the area of Disaster Risk Management (DRM). This has become a starting point for long-term adaptation planning in Caribbean SIDS. However, distinguishing between the two is fuzzy in practice.

8.3 Contributions to Theory

8.3.1 Overview

It is important to establish that no single planning theory is sufficient to cover all the dimensions and complexities involved in adaptation planning, including the barriers to adaptation. Although Caribbean SIDS share certain common characteristics which make them highly vulnerable to the effects of climate change, differential vulnerability within Caribbean SIDS (Rhiney, 2015) and the nuances of each local planning context necessitate the use of various approaches and theoretical insights to inform adaptation planning.

Different theories are particularly useful in illuminating specific aspects of the adaptation planning process. For example, political economy which focuses on how power dynamics, politics, competing interests among stakeholders, ideologies, negotiation, and marginalisation influences adaptation planning (see Giddens, 2008; Sovacool et al., 2015; Tanner & Allouche, 2011), is likely to be more suited for helping to understand the agenda-setting stage of the adaptation planning process. During the agenda-setting stage, various stakeholders leverage their power to let their voices be heard and lobby the political directorate for their interests to be

represented on the policy agenda. When at the policy formulation stage, insights into how best to proceed with formulating flexible and robust adaptation policies to address the dynamism and uncertainty involved in climate change adaptation can be drawn from the principles of adaptive governance (Birkmann, Garschagen, Kraas, & Quang, 2010; Djalante et al., 2011; Haasnoot et al., 2013; Holling, 1978; van Buuren et al., 2013). The theory of incremental planning (Butler, Devle, & Mutnansky, 2016; Kates, Travis, & Wilbanks, 2012; Linblom, 1959) particularly resonates during the implementation stage of adaptation planning. The research findings indicate that resource constraints in Caribbean SIDS have invariably resulted in an incremental approach to the implementation of adaptation policies and projects. Even in the absence of resource constraints, the multiple components involved in complex adaptation policies often require a phased implementation process. An incremental approach to adaptation planning often begins with the use of low-cost no-regret policies, before embarking on radical policy interventions. Depending on whether plans, policies, or projects are being evaluated, the monitoring and evaluation stage can be informed by the methodologies associated with the plan or project evaluation. In Caribbean SIDS, plan evaluation is rarely undertaken in planning practice. Project evaluation is more common and is usually undertaken in keeping with methodologies prescribed by international donor agencies.

To highlight the contribution of this research to planning theory, three specific theories are discussed in detail. These theories are: rational planning, incremental planning, and disjointed multi-level governance. The discussion of these theories is grounded in the research findings and supplemented by the planning theory literature.

8.3.2 Rational Planning

This research reiterated the importance of rational planning as a procedural planning theory which can help us to formulate a basic understanding of the various steps involved in a comprehensive adaptation planning process. In this regard, rational planning proved to be useful in providing a high-level overview or analysis of the adaptation planning process. In addition, it also enabled mapping the barriers to adaptation to the respective stages of the adaptation planning process. This facilitated a nuanced analysis of the ways in which the barriers to adaptation constrain the development, implementation, monitoring, and evaluation of adaptation policy interventions. This level of analytical detail is necessary to help address the barriers to adaptation. By being able to determine the precise ways in which identifiable barriers impact the different stages of the adaptation planning process, strategies for overcoming the barriers to adaptation can be more targeted.

Rational planning not only influences policy decisions but also shapes the organization of planning practice in Caribbean SIDS. This reflects the ubiquitous influence of the rational planning model and shows the basis for the managerial and organizational mechanisms which support planning in Caribbean SIDS. For example, cabinet creates the high-level planning agenda for the government. This agenda is normally encapsulated in national vision plans described in sections 3.6.2 and 5.3.1. The planning agenda created by cabinet guides the line ministries which formulate sectoral policies to help achieve key objectives outlined in the vision plans. In those Caribbean SIDS with a formal system of local government, municipalities are tasked with implementing and enforcing certain planning regulations appended to national and, in some cases, sector-based policies. Monitoring and evaluation is undertaken by line ministries and central government agencies in partnership with local municipalities. In those territories

without a formal system of local government, a compliance unit within the national spatial planning agency or equivalent body undertakes the enforcement of planning regulations.

Rational planning can be viewed as heuristic against which other forms of planning can be judged. For example, the sequence of activities depicted in the rational planning model is also reflected in scenario planning for climate change adaptation whereby policy makers:

- Consider all available alternatives, i.e. scenarios which may arise;
- Evaluate each alternative/scenario; and
- Select the option/scenario that is most probable.

Forward thinking is one of the defining hallmarks of planning (Berke & Stevens, 2016) which is rooted in the rational planning model. Adaptation planning can be conceived as a process whereby a society reduces its vulnerability to climate change by constantly seeking to pursue more sustainable pathways to development. Policy makers involved in adaptation planning seek to develop forward-thinking plans and policies by using current data to extrapolate possible future climate change impacts and vulnerability, which in turn guides policy development. As highlighted in sections 2.6.1 and 5.2.2 disaster risk reduction and disaster risk management are key features of adaptation planning in Caribbean SIDS. Both disaster risk reduction and disaster risk management are rooted in hazard mitigation planning which according to Berke and Stevens (2016) is predicated on the following four-step process:

1. assessing hazard risk and vulnerability to the system of concern;
2. setting planning goals and objectives to reduce identified risks and vulnerabilities;
3. creating and implementing policies and programs to achieve planning goals and objectives;

4. monitoring and evaluating the results.

The rational planning model has been criticized as being over-reliant on technical expertise, simplistic and linear - hence masking the complexities involved in real-world planning (Innes & Booher, 2010; Huxley & Yiftachel, 2000; Fainstein & Campbell, 2012). However, evidence from planning practice in Caribbean SIDS suggests that rational planning is capable of blending technical analyses with public engagement and consultation as a form of best practice. This is evident in several local community-based adaptation planning projects. For example, as outlined in section 5.5 the UNEP sponsored Risk and Vulnerability Assessment Methodology Project (RiVAMP) which was piloted in the coastal community of Negril, Jamaica combines technical scientific knowledge with the local indigenous knowledge to assess disaster risk reduction in coastal ecosystems.

8.3.3 Incremental Planning

Institutional, resource, and political constraints limit the ability of policy makers to undertake long-term radical transformational changes to advance adaptation in Caribbean SIDS. Climate change adaptation objectives are embedded in high-level national vision plans and policy instruments which are intended to strategically steer planning towards sustainable forms of development. As indicated in sections 3.6.2 and 5.3.1, the far-reaching transformational changes which national vision plans seek to achieve cannot be implemented in unison because the electoral cycle is too short for politicians to address all the issues at once. Furthermore, the resources needed for full implementation are never present during the plan making stage, but are subsequently generated over time. In addition, barring extensive climate-related disasters, political leaders and members of the public are reluctant to embrace the uncertainty involved in

undertaking rapid transformational changes – the failure of which carries a high political price (Gualini, 2001; Kates et al., 2011; Pelling 2011a).

The planning process within liberal democracies, including Caribbean SIDS, is always undergoing constant revision and adjustments. Within this dynamic environment, planning objectives, including those related to climate change adaptation, are subject to on-going change. To maintain political control over the planning agenda, as well as gradually transition society towards a more desirable state utilizing resources as they become available, national governments within Caribbean SIDS outline their planning priorities using medium-term socio-economic frameworks. While medium-term socio-economic frameworks in Caribbean SIDS are guilty of focusing on short-term economic growth and poverty reduction at expense of long-term adaptation, the use of medium-term socio-economic frameworks typifies an incremental approach to planning which also has some advantages of its own. An incremental approach to adaptation allows for iterative climate risk management and use of low-regret intervention measures which lay the foundation for subsequently implementing more far-reaching measures (Butler et al., 2016). Besides the use of medium-term socio-economic frameworks, other examples of incremental planning in Caribbean SIDS is the gradual shift from relying mainly on sectoral climate change policy to the creation of broad-based national climate change policies bolstered by the establishment of special government departments which focus exclusively on climate change issues. This is resulting in climate change slowly becoming a policy niche in Caribbean SIDS.

In the context of Caribbean SIDS where resource and time constraints do not allow for the comprehensive implementation of the adaptation objectives contained in national vision plans, an incremental approach to adaptation can be complemented with the use of mixed

scanning to help strike a balance between the strategic and operational levels of planning. Mixed scanning as defined by Etzioni (1986, p.8) is "a hierarchical mode of decision making that combines higher order fundamental decision making with lower order incremental decisions that work out and/or prepare for the higher order ones". A broad scan of the policy problem is undertaken to gain a general overview of the salient issues. This is followed by a detailed examination of specific issues that arise from the broad scan. Mixed scanning thus allows for a lower level and short-term policy decisions to be framed within a broader overarching context. Mixed scanning is potentially useful for integrating climate change adaptation objectives stated in long-term national vision plans into operational medium-term socio-economic frameworks which are used to steer the planning agenda in Caribbean SIDS. This recommendation comes against the backdrop of the research findings which indicate that climate change is not sufficiently integrated into medium-term socio-economic frameworks in Caribbean SIDS.

8.3.4 Disjointed Multi-Level Governance

The architecture for adaptation planning in Caribbean SIDS outlined in section 3.6 describes a multi-level governance arrangement with interrelated policy and planning instruments for addressing adaptation at the regional, national, and local levels. However, evidence from practice indicates that the theory of multi-level governance does not fit neatly into the Caribbean SIDS context. From a normative perspective, power and strategic decision-making takes place at higher levels of planning (Amundsen et al., 2010; Phal-Wostl, 2009; Saito-Jensen, 2015). However, an important observation drawn from this research is that within multi-level planning and governance arrangements, effective or meaningful power does not always reside with the institution(s) at the top. This is particularly the case where multi-level governance arrangements are rather loose, as is the case in Caribbean SIDS. Although there is an overarching

Regional Framework which seeks to guide CARICOM's response to climate change, the framework is not legally binding on CARICOM member states. To a large extent, it is the independent actions taken by national governments within CARICOM which operationalize the Regional Framework.

Within CARICOM, the linkages between regional and national level policies with regards to environmental matters are very weak (see Scobie, 2016). Decisions made by CARICOM with regards to climate change, though agreed on by member states, have no legal moorings. More importantly, there is limited resource and technical support from CARICOM via the Caribbean Community Climate Change Centre (CCCCC) to support the implementation of the Regional Framework at the national level within CARICOM member states. Thus, the real locus of power to effect practical meaningful change in support of adaptation does not reside in the high level regional institutional and policy mechanisms created by CARICOM, but in national-level policies and institutions.

8.4 Takeaway for Practice

This research provided two key lessons for adaptation planning practice. The first relates to the dominance of the project-oriented approach to adaption planning in Caribbean SIDS. The other addresses the issue of how to balance politically contrived short-term approaches to planning with long-term adaptation.

The research findings indicate that resource constraints within Caribbean SIDS have resulted in an over-reliance on international donor funding to drive adaptation planning. A major component of adaptation planning in Caribbean SIDS is the implementation of various local pilot projects – the intention being that these pilot projects if proven successful, would be

subsequently replicated or scaled-out. While projects are a useful feature of adaptation planning in Caribbean SIDS, the research findings presented in section 5.4.1 also indicate that projects are often undertaken in a fragmented and ad hoc manner without being integrated into a strategic action plan. In addition, once a project is completed very little follow up support activities take place to ensure continuity due to the absence of funding (Scobie, 2016). Quintessentially, the project-oriented approach to adaptation currently employed in Caribbean SIDS lacks permanency and cannot be sustained on an ongoing basis due to the volatility of international funding. It is, therefore, imperative that planners and policy makers within Caribbean SIDS explore the use of an alternative model as the centerpiece of local adaptation planning.

A more permanent and cost-effective strategy to drive local adaptation planning in Caribbean SIDS is to use the planning approval process to strengthen the linkages between planning and climate change adaptation. There are legally enforceable planning regulations which lend support to local climate change adaptation and mitigation – requirements which developers usually have to fulfill as a prerequisite for obtaining planning approval from the relevant authorities. Through the planning approval process, environmental and planning regulations can be used to shape development at the community level in ways which serve to further enhance adaptation and mitigation. The advantage of utilizing this approach to drive local adaptation is that formal development control mechanisms are already in place in all Caribbean SIDS, notwithstanding that in some cases planning regulations are out-dated, ineffective and need to be updated. This does not necessarily require significant additional financing for implementation. In addition, development control measures are applied across a wide range of planning activities – more than the scope of any single local adaptation project.

This suggestion is by no means novel, to say the least. What essentially is being suggested is to practically revisit the role of planning in climate change adaptation. This no doubt will require planning reform in Caribbean SIDS. Policies and planning regulations will need to be updated in a timely manner to ensure that they are relevant and of enforceable value. Political will and resources will have to be expended to build the capacity for enforcing planning regulations, as currently this is very weak. However, it does not require an endless stream of capital to create and sustain a culture of enforcement and compliance. Using the planning approval process to drive local climate change adaptation does not negate but rather complement the use of externally funded projects to promote local adaptation, while gradually lessening the reliance on such projects drives the adaptation process.

Planning, particularly in developing countries is inextricably wedded to politics (Rakodi, 2001). This is a blunt reality which planners and policy makers have to accept and deal with. The political system within CARICOM member states follows a 5-year election cycle. To demonstrate their electability and hold on to power, politicians need to prove to the electorate how much they can do within each 5-year term to address the chronic developmental challenges facing the region. From a political perspective, this makes time one of the most important factors in the planning process. As highlighted in sections 3.6.2 and 5.3.1 for political and management purposes national governments in CARICOM use 3-5 years medium-term socio-economic planning frameworks to align planning timeframes to match election cycles. Invariably, this means that preference is given to addressing immediate short-term priorities – priorities which often does not include climate change adaptation because it is perceived as a long-term issue. This reflects the incongruity between short-term planning and long-term climate change adaptation in Caribbean SIDS.

To strike a balance between short-term planning and long-term adaptation, it is necessary for policy makers to find ways to integrate climate change into the medium-term socio-economic planning frameworks – the default planning agenda that is used to drive planning in Caribbean SIDS. Long-term climate change objectives need to be broken down into short-term goals and activities to facilitate their uptake into medium-term socio-economic frameworks. Greater use of incremental and no-regret adaptation measures is needed, while simultaneously maintaining a state of readiness to capitalize on windows of opportunity for effecting radical transformational change.

There is also need to address the barriers to adaptation in a holistic manner, given the strong interrelationship which exists among the various barriers. However, resource and other capacity constraints in Caribbean SIDS mean that all the identifiable barriers to adaptation cannot be tackled at once. Priority must, therefore, be given to those cross-cutting barriers which affect all aspects of adaptation planning. In addition, in an effort to adapt to climate change, Caribbean SIDS should be careful not to overreach beyond that which their existing capacity allows. This will likely lead to putting in much effort but having very little positive results to show. Caribbean SIDS should gradually build on those aspects of adaptation in which they have the most experience and capacity, and through a process of shared learning broaden the scope of adaptation into new domains.

8.5 Future Research Direction

The following are possible areas of research which can potentially further expand on the issues examined and the findings gathered from this research.

I. Exploration of the linkages between climate change adaptation and sustainable development in planning practice.

The adaptation literature, particularly the aspects which espouse a social-constructivist approach to vulnerability and adaptation, assert that the underlying factors which determine adaptive capacity are essentially the same factors which promote sustainable development. Sustainable development is a laudable planning objective stated in virtually almost every contemporary policy document and is often banded about by academics, policy makers and politicians alike. However, actual development policies as observed in planning practice reflect a dichotomy between climate change adaptation and the pro-growth planning mantra promulgated by neoliberal development economists. Bridging this dichotomy is essential to creating stronger linkages between economic development and climate change adaptation.

II. Interdisciplinary research on the impact of austerity measures on adaptation and mitigation planning in SIDS.

Structural readjustment in several Caribbean SIDS, and elsewhere, has resulted in the imposition of economic austerity measures. Such measures normally require cutbacks in public expenditure and reduced borrowing to lower the national debt. This has implications for the maintenance of public infrastructure and the provision of basic urban services on the part of the state. For example, failure to upkeep drains due to municipal budget cuts can exacerbate the risk of flooding. Vital large-scale adaptation projects necessary for maintaining ecosystem services and protecting local livelihoods may be delayed due to lack of resources, further pushing SIDS towards irreversible adaptation tipping points. These are poignant contemporary issues facing SIDS which interdisciplinary research teams involving economists, planners, and ecologists can explore in an attempt to improve our understanding and identify possible solutions.

III. Understanding and strengthening the role of monitoring and evaluation in climate change adaptation planning.

Monitoring and evaluation is a nascent practice which has not yet been fully institutionalized as part of the adaptation planning process (Preston et al., 2011). It is in the area of monitoring and evaluation that the least progress is being made in adaptation planning. Climate change related plans and policies pay scant attention to the issue of monitoring and evaluation which is treated as an afterthought, as opposed to being accorded due attention during all stages of the adaptation planning process. The Caribbean is ripe for conducting a large-scale comprehensive study on monitoring and evaluation in adaptation planning in SIDS. There are numerous adaptation related plans and policy documents, particularly at the national level, for which there are no established indicators and methodology which can be used to evaluate them. The same situation also exists outside of the SIDS context as well.

Five key components of strengthening the role of monitoring and evaluation in adaptation planning are worth examining:

a) defining and articulating the indicators for successful adaptation;
b) developing a systematic methodology for monitoring and evaluating progress in climate change adaptation planning;
c) identifying and assessing the effectiveness of available tools for undertaking monitoring and evaluation;
d) barriers to undertaking monitoring and evaluation in adaptation planning; and
e) transitioning from the evaluation of adaptation projects to the evaluation of adaptation plans and policies.

8.6 Reflections and Concluding Remarks

Undertaking this doctoral research can be likened to an intense process of sifting through a ton of sand to obtain and purify an ounce of rare gold, yet to be discovered. This research process began by sifting through copious volumes of literature on climate change adaptation planning, with the hope of discovering that missing link which would illuminate the darkest obscurity which exists in the field of adaptation planning. As I delved more into the literature with the passing of time, the dream of having an illuminating renaissance-like discovery began to morph into the reality that the invention of the printing press was the sum total of all the writing technologies developed by mankind up until that time, and not an isolated feat of ingenuity by Johannes Gutenberg. Acceptance of this reality allowed me to decisively settle on this research topic for my dissertation after much wandering.

Looking back at this journey, there are four key aspects which gave me valuable insights into, and experience in conducting high-level scholarly research. The first aspect is succinctly outlining and contextualizing a research problem. The second is developing the appropriate methodology to investigate the research problem. The third is effectively gathering the pertinent data needed for the research. The fourth is teasing out the critical issues from the data and disposing of non-essential information.

Initially, I started out by trying to create a full proof introduction which would serve as a comprehensive roadmap for my research. The research methodology was developed to support my interpretation and framing of the research problem. However, as I began the data collection process and started to analyze the preliminary results, discrepancies began to appear in terms of how I framed the research problem and the actual manifestation of the problem in planning practice. I then revisited the research problem to ensure that it was grounded in both theory and

practice. This was essential given that the aim of this research is to advance both theory and practice. While providing both qualitative and quantitative data, the use of a mixed method approach was messy at times, in the sense that the process of gathering the data was not always as systematic as envisioned. Once the data was gathered, there was the temptation of trying to use every bit of data, even though some of the information gathered proved to be not pertinent to the research.

Overall, my take away from this exercise is that research is not always a neatly organized process. Much like good policy making, research is an iterative non-linear process with constant adjustments in the quest to derive optimal research outputs.

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Appendices

Appendix A – Survey Instrument

Section A: Respondent Information

Name:	Click or tap here to enter text.
Country:	Choose an item.
Agency:	Click or tap here to enter text.
Title / Position:	Click or tap here to enter text.
E-mail:	Click or tap here to enter text.
Phone:	Click or tap here to enter text.

Where would you rank your level of understanding with regards to climate change? Please select an option from the dropdown menu. Choose an item.

Instructions: Please answer the following questions by selecting a response(s) from the list of options provided. Where questions require a written response, expandable text boxes are provided.

The following explains the rating scale used for some of the questions in this survey.

Ratings	Validation
Very Significant	✓ A most relevant issue ✓ First order priority ✓ Has a direct bearing on major issues ✓ Must be urgently resolved, or treated
Significant	✓ Is a relevant issue ✓ Second order priority ✓ Considerable impact
Partially Significant	✓ Marginally relevant ✓ Third order priority ✓ Has little importance ✓ The issue does not have to be urgently or fully resolved
Insignificant	✓ Not a determining factor to a major issue ✓ No measurable effect
Very Insignificant	✓ No relevance ✓ No priority ✓ Should be dropped as item to consider

Section B: Overview of climate change adaptation planning in the Caribbean

Questions 1 – 4 focuses on assessing the impacts and vulnerability to climate change, largely within the context of coastal communities.

1. How significant are the following climate change impacts on coastal communities in your country? Please select an option from the dropdown menu.

- Severe drought and prolonged water restrictions Choose an item.
- Intense rainfall causing flooding and or landslides Choose an item.
- Prolonged hot temperatures well beyond normal or seasonal weather Choose an item.
- Increase incidence of tropical depression, storms, and hurricane Choose an item.
- Beach erosion Choose an item.
- Increase in vector (mosquito) borne diseases Choose an item.
- Coral bleaching Choose an item.
- Other (specify) Click or tap here to enter text.

2. In your opinion, which economic sector in your country is **most vulnerable** to the impacts of climate change? (Only one response allowed)

[ ] Housing

[ ] Fisheries

[ ] Tourism

[ ] Agriculture & Forestry

[ ] Infrastructure

[ ] Health

[ ] Water

[ ] Other (specify) Click or tap here to enter text.

3. Have any assessments of potential **climate change impacts and vulnerability** within coastal communities in your country been completed by OR for use by your agency?

[ ] Yes [ ] No

3a) If **Yes**, how are these assessments being used by your agency?

(Specify) Click or tap here to enter text.

3b) If **No**, have there been any discussions regarding the need for such assessments to be done?

[ ] Yes [ ] No

4. List what you believe are the three **leading factors** contributing to climate change vulnerability in coastal communities within your country.

   i) Click or tap here to enter text.
   ii) Click or tap here to enter text.
   iii) Click or tap here to enter text.

5. What responses are being undertaken or considered to address climate change adaptation in coastal communities in your country? Please select an option from the dropdown menu.

- Hard infrastructure, e.g. sea walls, breakwater, gryones, etc. Choose an item.
- Rehabilitation of coastal ecosystems and natural defences, (e.g. replanting mangroves, coral reef regeneration, beach nourishment) Choose an item.
- Creation of protected areas Choose an item.
- Coastal retreat or increase coastal setback Choose an item.
- Improved building regulations Choose an item.
- Strengthening local disaster management Choose an item.
- Local adaptation research, monitoring and reporting Choose an item.
- Campaign to sensitize the public about adaptation Choose an item.
- Greater community engagement in planning and decision-making Choose an item.
- Rain water harvesting Choose an item.
- Institutional and legislative reform Choose an item.
- Other (specify) Click or tap here to enter text.

Questions 6, 7 & 8 are related to the level of adaptation planning currently taking place in agencies like yours that are directly or indirectly involved in managing spatial (land use) development.

6. Has there been any formal climate change discussion within your agency (e.g. workshops, strategic / expert meetings, etc)

   [ ] Yes [ ] No

   6a) If Yes, briefly describe the nature of these discussions.

   Click or tap here to enter text.

7. Is there anybody in your agency specifically responsible for climate change issues (this includes legislation, policy, research, planning, project implementation, monitoring and evaluation)

   [ ] Yes (individual) [ ] Yes (more than one individual) [ ] No

8. Does your agency have a climate change adaptation strategy or action plan? (Only one response allowed)

[ ] We have an adaption strategy / action plan in place

[ ] We are now in the process of developing an adaptation strategy / action plan

[ ] We do not have an adaptation strategy / action plan, but we have been incorporating adaptation measures into existing plans and policies

[ ] We do not have an adaptation strategy / action plan and is not considering adaptation at this time

[ ] Other (specify) Click or tap here to enter text.

9. In your opinion, how much consideration is given to mainstreaming or integrating climate change adaptation measures into **development plans**, or other **management plans** governing coastal areas in your country? Please select an option from the dropdown menu.
   Choose an item.

10. Considering that access to relevant data and information plays an important role is addressing climate change. Please rate the level of information currently available to your agency. Select an option from the dropdown menu

- Local weather data (e.g. temperature and rainfall trends) Choose an item.
- Local community level climate risk and vulnerability assessments Choose an item.
- Land use change Choose an item.
- Best practices in adaptation from other jurisdictions Choose an item.
- Information on the impacts of climate change on local and marine and terrestrial ecosystems Choose an item.
- Hazard maps and GIS data Choose an item.
- Information on the impacts of climate change on local planning, policy, and management Choose an item.
- Strategies for responding to climate change impacts Choose an item.
- Information and strategies on how to effectively communicate facts, issues, consequences and solutions to climate change to the public and elected officials Choose an item.
- New technology and design alternatives to support adaptation Choose an item.

11. Research has pointed to a growing need to monitor and evaluate progress towards climate change adaptation. Is your agency involved in any form of **monitoring and evaluation** of local climate change impacts and adaptation initiatives (e.g. damages and loss of life resulting from extreme weather events, ex-post evaluation of adaptation projects)? Only one response allowed

[ ] Yes, monitoring and evaluation of climate change is part of our activities

[ ] Monitoring and evaluation is currently being considered

[ ] No, we do not undertake monitoring and evaluation of climate change and is not considering it at this point in time.

12. The following list of statements seeks to elicit your views on the nature of adaptation related projects / initiatives being undertaken in your country. Please select an option from the dropdown menu

- Adaptation projects are fragmented, one-off, and need to better streamlined and integrated into long term strategic plans / vision. Choose an item.
- Locally established thresholds of climate risk and vulnerability, as well as adaptation targets, are either non-existent or not sufficiently taken into consideration when developing and implementing adaptation projects. Choose an item.
- Adaptation projects are driven by the terms and conditions of the funding agencies and are not sufficiently contextualized to meet local needs. Choose an item.
- There is need to further explore low cost, self-sustaining, indigenous adaptation options in local climate change related projects. Choose an item.

13. The following question seeks to identify the enabling or **positive factors** influencing what ever adaptation activities that are taking place within your country. What are the major factors which have or can facilitate progress towards climate change adaptation within coastal communities in your country? Click or tap here to enter text.

Section C: Barriers to Adaptation Planning

The following statements represent a list of various barriers or challenges that are commonly encountered when planning for climate change adaptation. Please rate each barrier by selecting an option from the dropdown menu.

List A

1. Belief among some members of the public that extreme weather events are divine interventions Choose an item.

2. Insufficient interest in, concern about, or understanding of climate change and the urgent need to adapt on the part of political leaders and members of the public Choose an item.

3. Poor understanding on the part of planners and policy makers of the non-physical factors which influence vulnerability to climate change Choose an item.

4. Inability of members of the public to make the connection between extreme weather events and climate change Choose an item.

5. Lack of knowledge among planners and policy makers on how and where to start tackling adaptation Choose an item.

6. Conflicting interest among the various stakeholders involved in adaptation Choose an item.

7. Poor communication between climate scientists and policy makers responsible for adaptation Choose an item.

8. Lack of communication and coordination among the agencies responsible for planning and implementing adaptation actions Choose an item.

9. Absence of a clearly defined adaptation planning process Choose an item.

10. Lack of a mandate or requirement to do adaptation planning Choose an item.

11. Institutional fragmentation, i.e. unclear and overlapping mandates, lack of clarity on responsibility, leadership roles, turf issues, etc. Choose an item.

12. Out-dated building codes, planning, and environmental legislation Choose an item.

13. Weak enforcement of existing planning regulations Choose an item.

14. Excessive bureaucracy in undertaking adaptation initiatives Choose an item.

15. Entrenched methods and practices of planning that are unsuitable to address climate change adaptation Choose an item.

16. Failure to integrate internationally funded adaptation projects into on-going local planning and development Choose an item.

List B

17. Lack of relevant, accessible, and understandable climate information to aid in adaptation decision-making Choose an item.
18. Lack of adequate staff expertise on climate change and vulnerability assessments among planning agencies Choose an item.
19. No established budget to undertake community level adaptation planning Choose an item.
20. Poor record keeping by local and or central government agencies of data that could help inform adaptation planning Choose an item.
21. Inability to sustain and replicate adaptation projects once donor funding ends Choose an item.
22. Inadequate tools to aid adaptation decision and policy-making Choose an item.
23. Inability of vulnerable households to afford insurance coverage Choose an item.
24. Current development challenges overshadow long term climate change adaption Choose an item.
25. Limited scope and spatial jurisdiction of adaptation related policies Choose an item.
26. Differences between short term planning and project cycles and long term climate change projections and impacts Choose an item.
27. Lack of openness on the part of decision makers to a range of adaptation options Choose an item.
28. Uncertainties regarding future climate change impacts and adaptation outcomes Choose an item.

29. Lack of political will and commitment Choose an item.

30. High number of informal and illegal settlements Choose an item.

31. Encroachment on ecologically sensitive and hazard prone lands Choose an item.

Appendix B - Recruitment Letter for Survey

Dear Participant,

You are invited to participate in a doctoral dissertation research study conducted by Dellarue Howard, under the supervision of Dr. Mark Seasons of the School of Planning, University of Waterloo, Canada. The purpose of the study is to assess the general state of climate change adaptation planning within Caribbean Small Island Developing States and identify the constraining and enabling factors which influence adaptation.

If you decide to volunteer, you will be asked to complete a confidential 15 – 20 minute online survey. Participation in this study is voluntary. You can decide to withdraw from this study at any time if so desired. There are no known or anticipated risks from participating in this study. All the information provided will be strictly used for research purposes. The data collected from this survey will be electronically secured on a password protected external hard drive and erased within seven years of completing this study in keeping with the data storage requirements of the University of Waterloo.

To ensure the confidentiality of information transmitted over the internet, your participation in this survey is not intended to collect machine identifiers such as IP addresses. Should survey monkey (the external host system), over which there is no control, collect this information without my knowledge, it will be removed promptly once this becomes known. If you prefer not to submit your survey responses through this host, please contact me so that you can participate using an alternative method such as through an e-mail or paper-based questionnaire.

To ensure confidentiality in the dissemination of the research findings, personal identifiers such as names, job title/position, place of employment, etcetera will not be used in the thesis report or any publication emanating from this research. Also, where possible, naming specific Caribbean islands in the thesis report will be avoided as far as possible, but may be necessary at times. In such cases, persons who are aware of planning in the Caribbean may reasonably speculate about the possible source of the information.

In keeping with the principles of ethical research, this study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE # 22275). If you have questions for the Committee contact the Chief Ethics Officer, Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ore-ceo@uwaterloo.ca. For all other questions about this study, including obtaining a copy of the results, please feel free to contact me by e-mail: d4howard@uwaterloo.ca or by phone 1-226-606-6567.

Thank you for considering participating in this study.

Sincerely

Dellarue Howard, Ph.D. Candidate

School of Planning, University of Waterloo

d4howard@uwaterloo.ca

1-226-606-6567

Appendix C - Consent Form for Survey

By providing your consent, you are not waving your legal rights or releasing the researcher or involved institution from their legal and professional responsibilities.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

[ ] I agree to participate.

[ ] I do not wish to participate (please close your web browser now).

Appendix D - Interview Guide for Semi-Structured Key Informant Interviews

Theme	Lead Questions
Impacts & Vulnerability	To what extent are climate risk and vulnerability assessments used to guide adaptation related policies and projects in (name of country)? What are the key climate change impacts and vulnerabilities targeted within (name of country) and why? How have spatial development patterns enabled or constrained climate change adaptation, particularly in coastal communities?
Adaptation Planning Framework	What are the key policy mechanisms for addressing climate change adaptation in (name of country)? To what extent are existing policy mechanisms and planning regulations which support local climate change adaptation being enforced? Is there need for explicit climate change legislation to support adaptation planning or does the provisions of the Planning Act and other land development and environmental management related legislation provide an adequate basis for adaptation planning? To what extent are local adaptation projects integrated into a strategic policy framework? How are the diverse planning and environmental laws and policies related to climate change adaptation harmoniously integrated within the spatial development process? To what extent are climate change related goals and policies outlined in high level national vision plans translated into operational plans and policies? How important is CARICOM Regional Framework for climate change to advancing adaptation planning in Caribbean SIDS?

Theme	Lead Questions
Adaptation Responses	Outline the principal adaptation strategies which have ben used to address climate risk and vulnerability in coastal communities in (name of country)? What attempts are being made to promote climate change adaptation planning within the existing informal land development sector? To what extent are non-regulatory market-based mechanisms used to promote local climate change adaptation? Are there any examples of best practices in adaptation planning that can be found within the Caribbean? What are the existing opportunities for mainstreaming climate change adaptation into spatial development planning within (name of country)?
Barriers to Adaptation	What are the major barriers to mainstreaming adaptation into spatial development planning in (name of country)? How can the barriers to adaptation planning be addressed? How are short term development activities, planning and project cycles balanced with long term adaptation? Is there a need for exclusive budgetary support, technical and human resources to undertake local adaptation planning? How can national and local adaptation planning initiatives become more self-sustaining over the long term and less reliant on external donor funding? How would describe the level of coordination and collaboration between the various actors involved in adaptation planning? How would you describe the level of awareness and political support for adaptation planning?
Monitoring & Evaluation	Is there any form of monitoring and evaluation of climate change related policies and projects in (name of country)? Are there any indicators or benchmarks used to monitor and evaluate climate change adaptation in (name of country)?

Appendix E - Breakdown of Key Informants Interviews

Organization / Country	Number of Interviews
Caribbean Community Centre for Climate Change	2
Jamaica	
Climate Change Division	2
National Environment and Planning Agency	2
Planning Institute of Jamaica	4
Negril and Green Island Local Area Planning Authority	1
Barbados	
Town and Country Planning Division	2
Coastal Zone Management Unit	2
Ministry of Environment and Drainage	1
Dominica	
Town Planning Division	1
Environmental Coordinating Unit	2
St. Vincent & the Grenadines	
Sustainable Development Unit	2

Appendix F – Recruitment Letter for Interviews

Dear (participant name)

This letter is an invitation to participate in a study I am conducting as part of my Ph.D. research at the School of Planning, University of Waterloo. My research focuses on the relationship between planning and the barriers to climate change adaptation Caribbean Small Island Developing States (SIDS). Please allow me to provide you with some more information about this project and what your involvement would entail if you decide to take part.

As you are aware, climate change is a growing threat to sustainable development in Caribbean SIDS. Given your expertise in planning and policy-making, I am desirous of interviewing you by telephone or skype to ascertain your perspective on climate change and the barriers to adaptation planning in Caribbean SIDS. My skype ID is Dellarue Howard.

Participation in this study is voluntary. The interview will be strictly confidential. You will have an opportunity to review the transcript of the interview to confirm the accuracy of our conversation. You can also request that certain parts of the interview not be used in the thesis report or any publication emanating from this research. The interview will not exceed 30 minutes. You may decline to answer any of the interview questions if you so wish. Further, you may decide to withdraw from this study at any time by advising me the researcher. With your permission, the interview will be audio recorded to facilitate the collection of information, which will be later transcribed for analysis. To ensure confidentiality in the dissemination of the research findings, personal identifiers such as names, job title/position, and place of employment will **not** be used in the thesis report or publications emanating from this research. However, with your permission anonymous quotations may be used.

The data collected from this interview will be electronically secured on a password protected external hard drive and erased within seven years of completing this study in keeping with the data storage requirements of the University of Waterloo. Only researchers associated with this project will have access to the data.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE # 22275). If you have questions for the Committee, contact the Chief Ethics Officer, Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ore-ceo@uwaterloo.ca. If you would like additional information to assist you in reaching a decision about participation, please feel free to contact me by e-mail: d4howard@uwaterloo.ca or by phone 1-226-606-6567. I look forward to speaking with you and thank you in advance for your assistance with this project.

Attached is a consent form, as well as a list of the interview questions. If you know another individual who might be appropriate for an interview, I would appreciate it if you could pass this e-mail along to him or her.

Sincerely,

Dellarue Howard

Ph.D. Candidate, School of Planning

University of Waterloo

Appendix G – Consent Form for Interviews

By signing this consent form, you are not waiving your legal rights or releasing the investigator or involved institution from their legal and professional responsibilities.

I have read the information presented in the information letter about a study being conducted by Dellarue Howard of the School of Planning at the University of Waterloo. I have had the opportunity to ask any questions related to this study, to receive satisfactory answers to my questions, and any additional details I wanted.

I am aware that I have the option of allowing my interview to be audio recorded to ensure an accurate recording of my responses.

I am also aware that excerpts from the interview may be included in the thesis and/or publications to come from this research, with the understanding that the quotations will be anonymous.

I was informed that I may withdraw my consent at any time without penalty by advising the researcher.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE # 22275). If you have questions for the Committee contact the Chief Ethics Officer, Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ore-ceo@uwaterloo.ca.

For all other questions, please feel free to contact me by e-mail: d4howard@uwaterloo.ca or by phone 1-226-606-6567.

With full knowledge of all foregoing, I agree, of my own free will, to participate in this study.

☐YES ☐NO

I agree to have my interview audio recorded.

☐YES ☐NO

I agree to the use of anonymous quotations in any thesis or publication that comes of this research.

☐YES ☐NO

Participant Name: _____ (Please print)

Participant Signature: _____

Witness Name: _____ (Please print)

Witness Signature: _____

Date: _____

Appendix H – List of Documents Included in the Content Analysis

National Vision and Spatial Plans (5 years and under)

Country	Plan	Year
Bahamas	Vision 2040: The National Development Plan of the Bahamas (working draft)	2016
Barbados	Barbados Physical Development Plan Amendment (draft)	2017
Belize	Belize Integrated Coastal Zone Management Plan	2016
Dominica	Dominica National Land Use Policy Dominica National Physical Development Plan	2014 2016
Guyana	Framework of the Guyana Green State Development Strategy and Financing Mechanism	2017
Jamaica	Negril and Green Island Development Order*	2015
St. Vincent & the Grenadines	National Economic and Social Development Plan 2013 -2025	2013
Suriname	Development Plan 2017 - 2021	2017
Trinidad & Tobago	Vision 2030 National Development Strategy 2016 - 2030	2016

* The Planning Act in Jamaica requires the preparation of Development Orders (spatial development policies) for designated sections of the Island.

National Climate Change Policies & Action Plans

Country	Policy / Plan	Year
Anguilla	Transforming to a Climate-Resilient, Energy Efficient and Low Carbon Economy - Anguilla's Climate Change Policy (DRAFT)	2011
Antigua & Barbuda	Policy Framework for Integrated Adaptation Planning and Management in Antigua & Barbuda	2002
Bahamas	National Policy for the Adaptation to Climate Change	2005
Barbados	Barbados National Climate Change Policy	2012
British Virgin Islands	The Virgin Islands Climate Change Adaptation Policy – Achieving Low-Carbon, Climate Resilient Development	2012
Cayman Islands	Achieving a Low Carbon Climate-Resilient Economy: Cayman Islands' Climate Change Policy	2011
Dominica	Low-Carbon Climate-Resilient Development Strategy 2012 - 2020	2012
Guyana	Climate Resilience Strategy and Action Plan for Guyana	2015
Jamaica	Climate Change Policy Framework and Action Plan	2013
St. Lucia	The St. Lucia Climate Change Adaptation Policy	2015
Suriname	National Climate Change Policy, Strategy and Action Plan for Suriname 2014-2021	2015
Trinidad & Tobago	National Climate Change Policy	2011
Turks & Caicos Islands	Turks and Caicos Islands Climate Change Green Paper	2011

Appendix I – Ethics Approval

UNIVERSITY OF WATERLOO

OFFICE OF RESEARCH ETHICS

Notification of Ethics Clearance of Application to Conduct Research with Human Participants

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Faculty Supervisor: Mark Seasons
Faculty Supervisor: Daniel Scott
Student Investigator: Dellarue Howard

Department: Planning, School of
Department: Geography
Department: Planning, School of

ORE File #: 22275

Project Title: Linking Climate Vulnerability Assessments With Planning Processes to Support Adaptation in Coastal Caribbean Communities

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☑ *Human Research Ethics Committee (HREC)* ☐ *Clinical Research Ethics Committee (CREC) is pleased to inform you the above named study has been reviewed and given ethics clearance.*

Approval to start this research is effective on the ethics clearance date which is: 6/2/2017 *(m/d/y)*

University of Waterloo Research Ethics Committees are composed in accordance with, and carry out their functions and operate in a manner consistent with, the institution's guidelines for research with human participants, the Tri-Council Policy Statement for the Ethical Conduct for Research Involving Humans (TCPS, 2nd edition), International Conference on Harmonization: Good Clinical Practice (ICH-GCP), the Ontario Personal Health Information Protection Act (PHIPA), the applicable laws and regulations of the province of Ontario. Both Committees are registered with the U.S. Department of Health and Human Services under the Federal Wide Assurance, FWA00021410, and IRB registration number IRB00002419 (HREC) and IRB00007409 (CREC).

The above named study is to be conducted in accordance with the submitted application (Form 101/101A) and the most recent approved versions of all supporting materials.

Ethics clearance for this study is valid until: 6/2/2018 *(m/d/y). Multi-year research must be renewed at least once every 12 months unless a more frequent review has otherwise been specified by the Research Ethics Committee (Form 105). Studies will only be renewed if the renewal report is received and approved before the expiry date. Failure to submit renewal reports by the expiry date will result in the investigators being notified ethics clearance has been suspended and Research Finance being notified the ethics clearance is no longer valid.*

Level of review:
☑ *Delegated review*
☐ *Full committee review meeting date:* _____ *(m/d/y)*

Signed on behalf of: ☑ *HREC Chair* ☐ *HREC Vice-Chair* ☐ *CREC Chair* ☐ *CREC Vice-Chair*

☐ *Julie Joza, MPH, Acting Chief Ethics Officer, jajoza@uwaterloo.ca, ext. 38535*
☑ *Nick Caric, MDiv, Manager, ncaric@uwaterloo.ca, ext. 30321*
☐ *Karen Pieters, MPH, Manager, kpieters@uwaterloo.ca, ext. 30495*

This is an official document. Retain for your files.
You are responsible for obtaining any additional institutional approvals that might be required to complete this study.